

**Area Management Report for the Recreational  
Fisheries of the Upper Copper/Upper Susitna River  
Management Area, 2000-2001**

by

**Tom Taube**

December 2002

---

Alaska Department of Fish and Game

Division of Sport Fish



## Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used in Division of Sport Fish Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications without definition. All others must be defined in the text at first mention, as well as in the titles or footnotes of tables and in figures or figure captions.

Weights and measures (metric)		General		Mathematics, statistics, fisheries	
centimeter	cm	All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.	alternate hypothesis	$H_A$
deciliter	dL	All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	e
Gram	g	and	&	catch per unit effort	CPUE
hectare	ha	at	@	coefficient of variation	CV
kilogram	kg	Compass directions:		common test statistics	F, t, $\chi^2$ , etc.
kilometer	km	east	E	confidence interval	C.I.
Liter	L	north	N	correlation coefficient	R (multiple)
meter	m	south	S	correlation coefficient	r (simple)
metric ton	mt	west	W	covariance	cov
milliliter	ml	Copyright	©	degree (angular or temperature)	°
millimeter	mm	Corporate suffixes:		degrees of freedom	df
<b>Weights and measures (English)</b>		Company	Co.	divided by	÷ or / (in equations)
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	equals	=
foot	ft	Incorporated	Inc.	expected value	E
gallon	gal	Limited	Ltd.	fork length	FL
inch	in	et alii (and other people)	et al.	greater than	>
mile	mi	et cetera (and so forth)	etc.	greater than or equal to	≥
ounce	oz	exempli gratia (for example)	e.g.,	harvest per unit effort	HPUE
pound	lb	id est (that is)	i.e.,	less than	<
quart	qt	latitude or longitude	lat. or long.	less than or equal to	≤
yard	yd	monetary symbols (U.S.)	\$, ¢	logarithm (natural)	ln
Spell out acre and ton.		months (tables and figures): first three letters	Jan,...,Dec	logarithm (base 10)	log
<b>Time and temperature</b>		number (before a number)	# (e.g., #10)	logarithm (specify base)	log <sub>2</sub> , etc.
day	d	pounds (after a number)	# (e.g., 10#)	mid-eye-to-fork	MEF
degrees Celsius	°C	registered trademark	®	minute (angular)	'
degrees Fahrenheit	°F	trademark	™	multiplied by	x
hour (spell out for 24-hour clock)	h	United States (adjective)	U.S.	not significant	NS
minute	min	United States of America (noun)	USA	null hypothesis	$H_0$
second	s	U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)	percent	%
Spell out year, month, and week.				probability	P
<b>Physics and chemistry</b>				probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
all atomic symbols				probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
alternating current	AC			second (angular)	"
ampere	A			standard deviation	SD
calorie	cal			standard error	SE
direct current	DC			standard length	SL
hertz	Hz			total length	TL
horsepower	hp			variance	Var
hydrogen ion activity	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

***FISHERY MANAGEMENT REPORT NO. 02-07***

**AREA MANAGEMENT REPORT FOR THE RECREATIONAL  
FISHERIES OF THE UPPER COPPER/UPPER SUSITNA RIVER  
MANAGEMENT AREA, 2000-2001**

by  
Tom Taube  
*Division of Sport Fish, Glennallen*

Alaska Department of Fish and Game  
Division of Sport Fish, Research and Technical Services  
333 Raspberry Road, Anchorage, Alaska 99518-1599

December 2002

The Fishery Management Reports series was established in 1989 for the publication of an overview of Division of Sport Fish management activities and goals in a specific geographic area. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: <http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm> This publication has undergone regional peer review.

*Tom Taube*

*Alaska Department of Fish and Game, Division of Sport Fish,  
P.O. Box 47, Glennallen, AK 99588-0047, USA*

*This document should be cited as:*

*Taube, T. 2002. Area management report for the recreational fisheries of the Upper Copper/Upper Susitna River management area, 2000-2001. Alaska Department of Fish and Game, Fishery Management Series No. 02-07, Anchorage.*

The Alaska Department of Fish and Game administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information please write to ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; U.S. Fish and Wildlife Service, 4040 N. Fairfield Drive, Suite 300, Arlington, VA 22203 or O.E.O., U.S. Department of the Interior, Washington DC 20240.

For information on alternative formats for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-4120, (TDD) 907-465-3646, or (FAX) 907-465-2440.

# TABLE OF CONTENTS

	Page
LIST OF TABLES.....	iv
LIST OF FIGURES .....	v
LIST OF APPENDICES .....	v
EXECUTIVE SUMMARY .....	1
PREFACE.....	2
INTRODUCTION .....	2
Alaska Board of Fisheries.....	3
Advisory Committees .....	5
ADF&G Emergency Order Authority .....	5
Federal Regional Advisory Councils.....	5
Region III Sport Fish Division Research and Management Staffing.....	6
Statewide Harvest Survey.....	6
SECTION I: MANAGEMENT AREA OVERVIEW .....	7
Management Area Description.....	7
Fisheries Resources .....	9
Other User Groups.....	9
Alaska Board of Fisheries Activities .....	9
Advisory Committees.....	12
Recent Board of Fisheries Actions .....	12
Emergency Order Authority.....	14
Federal Subsistence .....	14
Statewide Harvest Survey.....	14
Economic Surveys.....	14
Sport Fishing Effort.....	18
Established Management Plans and Policies .....	18
Major Issues.....	22
Current Management and Research Activities .....	24
Research Projects.....	24
Management Projects.....	25
Access Programs.....	26
Information and Education .....	26
SECTION II: FISHERIES.....	26
Chinook Salmon Sport Fisheries .....	27
Gulkana River Chinook Salmon Sport Fishery.....	42
Background and Historic Perspective.....	42
Recent Fishery Performance .....	47
Management Objectives.....	47
Fishery Management.....	48
Fishery Outlook.....	49
Recent Board of Fisheries Actions .....	49
Current Issues.....	50

## TABLE OF CONTENTS (Continued)

	Page
Ongoing and Recommended Research and Management Activities .....	51
Klutina River Chinook Salmon Sport Fishery .....	52
Background and Historical Perspective.....	52
Recent Fishery Performance .....	55
Management Objectives.....	56
Fishery Management.....	56
Fishery Outlook.....	57
Recent Board of Fisheries Actions .....	58
Current Issues.....	58
Ongoing and Recommended Research and Management Activities .....	59
Other Copper Basin Chinook Salmon Sport Fisheries.....	60
Background and Historical Perspective.....	60
Management and Fishery Objectives .....	62
Recent Board of Fisheries Actions .....	62
Current Issues.....	63
Ongoing and Recommended Research and Management Activities .....	63
Sockeye Salmon Sport Fisheries .....	64
Gulkana River Sockeye Salmon Sport Fishery .....	64
Background and Historic Perspective.....	64
Recent Fishery Performance .....	66
Management Objectives.....	67
Fishery Management.....	67
Fishery Outlook.....	67
Recent Board of Fisheries Actions .....	67
Current Issues.....	67
Ongoing and Recommended Research and Management Activities .....	68
Klutina River Sockeye Salmon Sport Fishery .....	68
Background and Historical Perspective.....	68
Recent Fishery Performance .....	69
Management Objectives.....	69
Fishery Management.....	69
Fishery Outlook.....	69
Recent Board of Fisheries Actions .....	69
Current Issues.....	70
Ongoing and Recommended Research and Management Activities .....	70
Copper River Personal Use and Subsistence Salmon Fisheries.....	70
Background and Historical Perspective.....	70
Recent Fishery Performance .....	73
Management Objectives.....	78
Fishery Management.....	78
Fishery Outlook.....	79
Recent Board of Fisheries Actions .....	80
Current Issues.....	81
Ongoing and Recommended Research and Management.....	83
Arctic Grayling Sport Fisheries .....	83
Gulkana River Arctic Grayling Sport Fishery .....	88
Background and Historical Perspective.....	88
Recent Fishery Performance .....	90
Management Objectives.....	90
Fishery Outlook.....	91
Recent Board of Fisheries Actions .....	91
Current Issues.....	91
Ongoing and Recommended Research and Management.....	91
Lake Trout Sport Fisheries .....	92

## TABLE OF CONTENTS (Continued)

	<b>Page</b>
Background and Historical Perspective.....	92
Recent Fishery Performance .....	97
Management Objectives.....	97
Fishery Management.....	98
Fishery Outlook.....	98
Recent Board of Fisheries Action.....	98
Current Issues.....	99
Recommended Research and Management.....	99
<b>Burbot Sport Fisheries .....</b>	<b>99</b>
Background and Historical Perspective.....	99
Recent Fishery Performance .....	104
Management Objectives.....	104
Fishery Management.....	105
Fishery Outlook.....	105
Recent Board of Fisheries Actions .....	105
Current Issues.....	106
Ongoing and Recommended Research and Management.....	106
<b>Wild Rainbow and Steelhead Trout Sport Fisheries.....</b>	<b>107</b>
Background and Historical Perspective .....	107
Recent Fishery Performance .....	108
Management Objectives .....	108
Fishery Management.....	108
Fishery Outlook .....	108
Recent Board of Fisheries Actions.....	113
Current Issues .....	113
Ongoing and Recommended Research and Management Activities .....	113
<b>Dolly Varden Sport Fisheries .....</b>	<b>114</b>
Background and Historical Perspective.....	114
Recent Fishery Performance .....	114
Management Objectives.....	116
Fishery Management.....	116
Fishery Outlook.....	116
Recent Board of Fisheries Action.....	116
Current Issues.....	116
Ongoing and Recommended Research and Management.....	116
<b>Upper Copper / Upper Susitna Management Area Sport Fishery Enhancement .....</b>	<b>116</b>
Objectives.....	117
Actions .....	117
Evaluations.....	117
Fishery Statistics .....	120
<b>LITERATURE CITED.....</b>	<b>124</b>
<b>APPENDIX A.....</b>	<b>129</b>
<b>APPENDIX B .....</b>	<b>131</b>

## LIST OF TABLES

Table	Page
1. Commercial harvests of chinook and sockeye salmon in the Copper River District, 1977-2002.....	10
2. Reported subsistence (Glennallen and Chitina Subdistricts) harvests of chinook, sockeye, and coho salmon in the Copper River, 1977-2002.....	11
3. Emergency orders issued for UCUSMA sport and subsistence fisheries during 2000-2001 .....	15
4. Number of angler-days of sport fishing effort expended by recreational anglers fishing UCUSMA waters, 1977-2001 .....	19
5. Sport fishing effort (angler-days) in the UCUSMA by drainage, averaged for 1977 - 1989 and annually from 1990 - 2001 .....	21
6. Number of fish harvested, by species, by recreational anglers fishing UCUSMA waters, averaged for 1977 - 1989 and annually from 1990 - 2001 .....	28
7. Number of fish caught, by species, by recreational anglers fishing UCUSMA waters, 1990-2001 .....	29
8. Upper Copper River chinook salmon aerial escapement index counts, 1977-2002 .....	30
9. Copper River chinook salmon harvests and escapement indices, 1977-2002 .....	33
10. Harvest of chinook salmon by recreational anglers fishing UCUSMA waters, 1977-2001 .....	37
11. Harvest of chinook salmon by recreational anglers fishing in the UCUSMA by drainage, averaged for 1977 - 1989 and annually from 1990 to 2001 .....	39
12. Catch of chinook salmon by recreational anglers fishing in the UCUSMA by drainage, annually from 1990-2001 .....	40
13. Sport harvest and spawning escapement indices of chinook salmon in the Gulkana River drainage, averaged for 1977 - 1989 and annually from 1990-2001.....	44
14. Sport harvest and spawning escapement indices of chinook salmon in the Klutina River drainage from 1983-2001 .....	53
15. Harvest of sockeye salmon by recreational anglers fishing UCUSMA drainages, averaged for 1977 - 1989 and annually from 1990-2001 .....	65
16. Number of permits issued and salmon harvests during the Glennallen Subdistrict subsistence salmon fishery in the Copper River, 1977-2002.....	74
17. Number of permits issued and salmon harvested during the Chitina Subdistrict subsistence salmon fishery in the Copper River, 1984-2002 .....	76
18. Harvest of Arctic grayling by recreational anglers fishing UCUSMA waters, averaged for 1977 - 1989 and annually from 1990 to 2001.....	84
19. Harvest of Arctic grayling by recreational anglers fishing UCUSMA by drainage, averaged for 1977 - 1989 and annually from 1990 to 2001.....	86
20. Harvest and catch of Arctic grayling by recreational anglers fishing the Gulkana River drainage, averaged for 1977 - 1989 and annually from 1990 to 2001 .....	89
21. Harvest of lake trout by recreational anglers fishing UCUSMA waters, averaged for 1977-1989 and annually from 1990 to 2001 .....	94
22. Harvest of lake trout by recreational anglers fishing UCUSMA waters by drainage, averaged for 1977 - 1989 and annually from 1990 to 2001.....	95
23. Percent of lake trout released in lakes with 24" minimum size limit, 1990-2001 .....	96
24. Harvest of burbot by recreational anglers fishing UCUSMA waters, averaged for 1977 - 1989 and annually from 1990 to 2001 .....	101
25. Harvest of burbot caught by recreational anglers fishing in the UCUSMA by drainage, averaged for 1977 - 1989 and annually from 1990 to 2001 .....	102
26. Harvest of wild rainbow trout by sport anglers fishing UCUSMA waters by drainage, averaged for 1977 - 1989 and annually from 1990 to 2001 .....	109
27. Catch of wild rainbow trout by sport anglers fishing UCUSMA waters by drainage, annually from 1990 to 2001.....	110
28. Harvest of steelhead trout by sport anglers fishing UCUSMA waters by drainage, averaged for 1977 - 1989 and annually from 1990 to 2001 .....	111
29. Catch of steelhead trout by sport anglers fishing UCUSMA waters by drainage, annually from 1990 to 2001 .....	112



## LIST OF TABLES (Continued)

Table	Page
30. Harvest of Dolly Varden by sport anglers fishing UCUSMA waters by drainage, averaged for 1983 – 1989 and annually from 1990 to 2001 .....	115
31. Stocking schedule for remote lakes in the UCUSMA .....	118
32. Summary of stocking activities for stocked lakes in the UCUSMA, 2000–2002.....	119
33. Summary of projected game fish stockings for small remote lakes in the UCUSMA, 2003–2004.....	120
34. Effort, harvest, and catch statistics by species for stocked lakes in the UCUSMA 1991-2000.....	121

## LIST OF FIGURES

Figure	Page
1. Map of the sport fish regions in Alaska and the six Region III management areas.....	4
2. The Upper Copper/Upper Susitna Management Area (UCUSMA) .....	8
3. Sport fish effort in the UCUSMA, 1977-2001 .....	20
4. Upper Copper River chinook salmon aerial survey index escapement counts by drainage, 1977-2002 .....	32
5. Copper River District commercial harvest of chinook and sockeye salmon, 1977-2001 .....	35
6. Upper Copper River chinook salmon sport harvest by drainage, 1977-2001 .....	38
7. Map depicting the Gulkana River drainage.....	43
8. Gulkana River chinook salmon sport harvest and aerial survey index escapement counts, 1977-2001 .....	46
9. Klutina River chinook salmon sport harvest and aerial survey index escapement counts, 1977-2001 .....	54
10. Tonsina River chinook salmon sport harvest and aerial survey index escapement counts, 1977-2001.....	61
11. Copper River Glennallen Subdistrict subsistence harvest by species, 1977-2001 .....	75
12. Copper River Chitina Subdistrict harvest by species, 1977-2001 .....	77
13. Upper Copper/Upper Susitna Area Arctic grayling harvest, 1977-2001 .....	85
14. Map of major lake trout fisheries in the UCUSMA .....	93
15. Lakes supporting major burbot fisheries in the UCUSMA .....	100
16. Five-year moving averages for fishing effort (angler-days) and number of fish caught and harvested from stocked lakes in the UCUSMA, 1990–2000.....	122
17. Ten year average catch and harvest composition by species for all stocked lakes in the UCUSMA, 1991-2000 .....	123

## LIST OF APPENDICES

Appendix	Page
A. Listing of the addresses and contact numbers for information sources regarding UCUSMA information .	130
B. Reference information specific to 2002 Board of Fisheries proposals .....	132

## **EXECUTIVE SUMMARY**

This document provides a wide array of information specific to the recreational angling opportunities that exist within the Upper Copper/Upper Susitna Management Area. Information specific to the proposals that the Board of Fisheries will address at the December 8-15, 2002 meeting are contained within numerous sections of this report. As a means to assist board members in acquiring information in a timely manner, Appendix B has been constructed (page 132). This table guides the reader to specific information contained within text, table, and graphic format that, hopefully will be useful in evaluating regulatory proposals.

## **PREFACE**

The goals of the Sport Fish Division of the Alaska Department of Fish and Game are to conserve wild stocks of sport fish, to provide a diversity of recreational fishing opportunities, and to optimize social and economic benefits from recreational fisheries. In order to implement these goals the division has in place a fisheries management process.

This report provides information for the Upper Copper/Upper Susitna Management Area (UCUSMA) and is one in a series of reports annually updating fisheries management information about important sport fisheries within Region III. The report is written to make information available to the state Board of Fisheries, Fish and Game Advisory Committees, the general public, and other interested parties. It presents fisheries assessment information and the management strategies that are developed from that information. In addition, this report includes a description of the fisheries regulatory process, the geographic, administrative, and regulatory boundaries, funding sources, and other information concerning Sport Fish Division management programs within the area.

An annual regional area review is conducted in mid-winter during which the current status of important area fisheries is considered and research needs are identified. Fisheries stock assessment research projects are developed, scheduled, and implemented to meet information needs identified by fisheries managers. Projects are planned within a formal operational planning process. Biological information gathered during the course of these research projects is combined with effort information and input from user groups and is used to assess the need for, and development of fisheries management plans, and propose regulatory strategies.

Sport Fish Division management and research activities are primarily funded by a combination of State of Alaska Fish and Game (F & G) and Federal Aid in Fisheries Restoration (D-J) monies. The F & G funds are from the sale of fishing licenses. The D-J (Dingle-Johnson, named after the congressmen who wrote the act) funds are from a Federal tax on fishing tackle and equipment. The D-J funds are provided to the states at a match of up to three-to-one with the F & G funds. Funding source for W-B (Wallop-Breaux, authors of the act) money is a tax on boat gas and equipment. Other, peripheral funding sources can include contracts with various government agencies and the private sector.

This area management report provides information regarding the Upper Copper/Upper Susitna Management Area (UCUSMA) and its fisheries for 2000 and 2001, with preliminary information from the 2002 season. Following the introduction, which includes an overview of the region, this report is organized into two primary sections: management area overview, and fisheries. The fisheries section describes the major fisheries within the UCUSMA. Each fishery contains a background and historical perspective, recent fishery performance, management objectives, fishery management, fishery outlook, recent board of fisheries actions, current issues, and ongoing and recommended research and management activities.

## **INTRODUCTION**

The Alaska Board of Fisheries (BOF) divides the state into ten regulatory areas for the purpose of organizing the sport fishing regulatory system by drainage and fishery. These areas (different from regional management areas) are described in Title 5 of the Alaska Administrative Code (AAC 2002). Sport Fish Division of the Alaska Department of Fish and Game (ADF&G) divides the state into three administrative Regions with boundaries roughly corresponding to

groups of the BOF regulatory areas (Figure 1). Region I is Southeast Alaska. Region II covers portions of Southcentral Alaska, Kodiak, Southwestern Alaska, and the Aleutian Islands. Region III includes three of the BOF regulatory areas. They are the upper Copper and upper Susitna regulatory area, the Arctic-Yukon-Kuskokwim regulatory area, and the Tanana River drainage. Prior to 2000, a portion of the Arctic-Yukon-Kuskokwim regulatory area was excluded from Region III and included in Region II; this was the lower Kuskokwim drainage from the Aniak River downstream and Kuskokwim Bay.

Region III is the largest region, encompassing the majority of the landmass of the state of Alaska (Figure 1). The region contains over 1,357,080 km<sup>2</sup> (526,000 mi<sup>2</sup>) of land, some of the state's largest river systems (the Yukon, the Kuskokwim, the Colville, Noatak, and upper Copper and upper Susitna River drainage's), thousands of lakes and thousands of miles of coastline and streams. Regional coastline boundaries extend from Sheldon Point in the southwest, around all of western, northwestern and northern Alaska to the Canadian border on the Arctic Ocean. Region III as a whole is very sparsely populated, with the most densely populated center located in the Tanana River Valley. Fairbanks (population about 31,000) is the largest community.

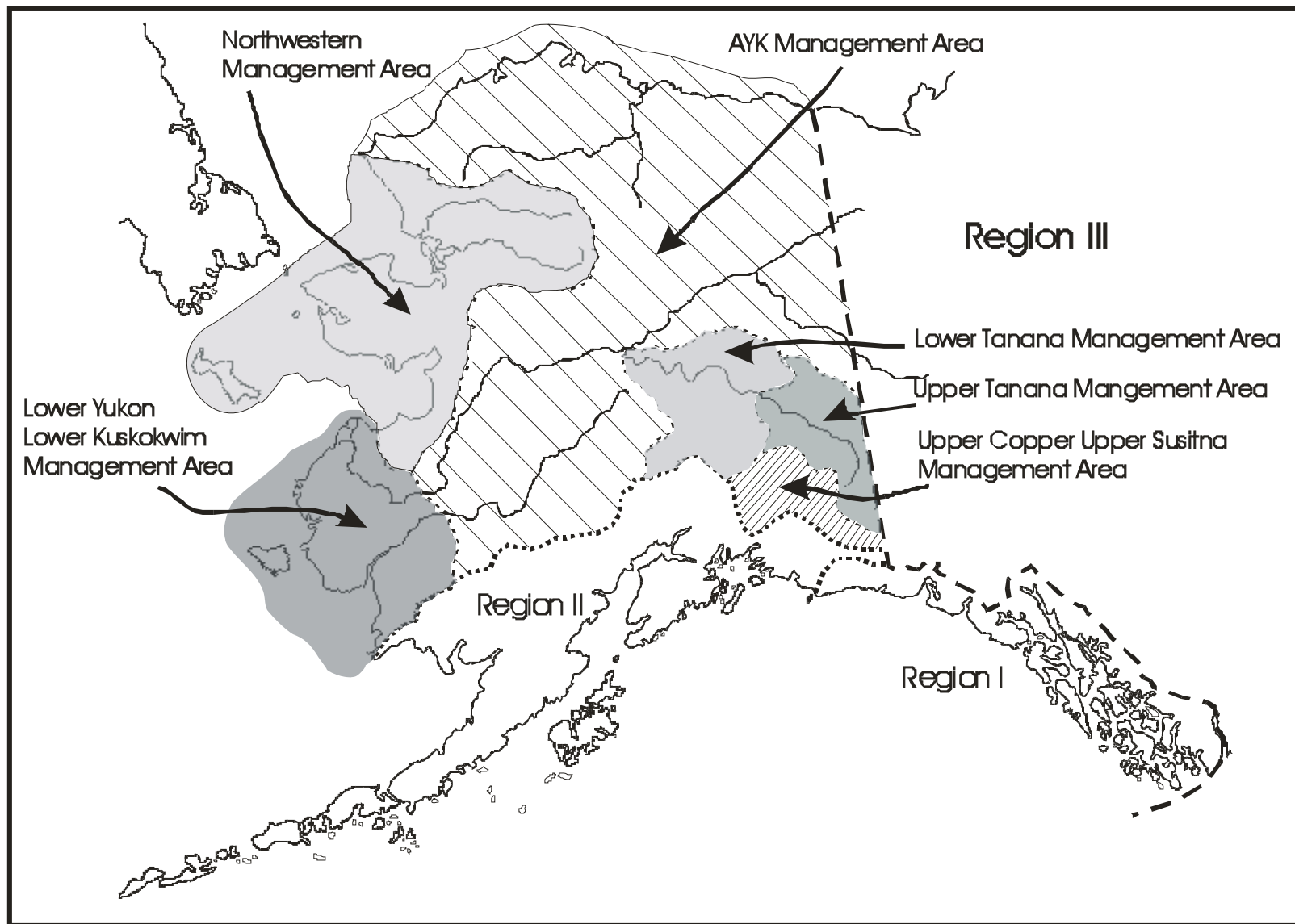
For administrative purposes Sport Fish Division has divided Region III into six fisheries management areas (Figure 1). They are:

- (1) The Northwestern Management Area (Norton Sound, Seward Peninsula and Kotzebue Sound drainages).
- (2) The Arctic-Yukon-Kuskokwim (AYK) Management Area (the North Slope drainages, the Yukon River drainage upstream of Paimiut except the Tanana River drainage, and the Kuskokwim River drainage upstream from the Aniak River).
- (3) The Upper Copper/Upper Susitna Management Area (the Copper River drainage upstream of Canyon Creek and Haley Creek, and the Susitna River drainage above the Oshetna River).
- (4) The Upper Tanana River Management Area (the Tanana River drainage upstream from Banner Creek and the Little Delta River).
- (5) The Lower Tanana River Management Area (the Tanana River drainage downstream from Banner Creek and the Little Delta River).
- (6) The Lower Yukon/Kuskokwim Management Area (the Yukon River drainage downstream of Paimiut and the Kuskokwim River drainage downstream of and including the Aniak River drainage and Kuskokwim Bay). This management area was created and added to Region III in 2000.

Area offices for the six areas are located in Nome/Fairbanks, Fairbanks, Glennallen, Delta Junction, Fairbanks, and Bethel, respectively.

## **ALASKA BOARD OF FISHERIES**

The Alaska Board of Fisheries (BOF) is the seven-member board that sets fishery regulations and harvest levels, allocates fishery resources, and approves or mandates fishery conservation plans for the State of Alaska. Board members are appointed by the Governor and must be confirmed by the legislature. Board members are appointed for three years.



**Figure 1.-Map of the sport fish regions in Alaska and the six Region III management areas.**

Statewide fisheries issues may be considered at any BOF meeting. Under the current operating schedule, the BOF considers fishery issues for regulatory areas or groups of regulatory areas on a 3-year cycle. The BOF meetings are usually in the wintertime, between early October and late March. Regulation proposals and management plans are received for evaluation by the BOF from ADF&G and the public (any Alaskan or individual can submit a proposal to the BOF), and during its deliberations the BOF receives input and testimony through oral and written reports from staff of the ADF&G, members of the general public, representatives of local fish and game advisory committees, and special interest groups such as fishermen's associations and clubs.

### **ADVISORY COMMITTEES**

Local fish and game advisory committees have been established throughout the state to assist the boards of fish and game in assessing fisheries and wildlife issues and proposed regulation changes. Advisory committee members are individuals from the local public who are nominated and voted on by all present during an advisory committee meeting. Most active committees in urban areas meet in the fall and winter on a monthly basis; rural committees have generally only one fall and one spring meeting due to funding constraints. Advisory meetings allow opportunity for direct public interaction with department staff that answer questions and provide clarification concerning proposed regulatory changes. The boards support section within the Division of Administration provides administrative and logistical support for the BOF and Fish and Game Advisory Committees. During 2001, the department had direct support responsibilities for 81 advisory committees in the state.

### **ADF&G EMERGENCY ORDER AUTHORITY**

ADF&G has emergency order (E.O.) authority (AAC 2002a) to modify time, area, and bag/possession limit regulations. Emergency orders are implemented to deal with conservation issues that arise that are not adequately controlled by existing regulations. In that scenario, they deal with the situation until it is resolved or the BOF can formally take up the issue. Emergency orders are also the mechanism by which "in-season" management of fisheries is accomplished. In-season management is usually in accordance with a fisheries management plan approved by the BOF.

### **FEDERAL REGIONAL ADVISORY COUNCILS**

Under ANILCA (Alaska National Interest Lands Conservation Act) the federal government requires the state of Alaska to establish use of fish and game by rural residents as the top priority of possible uses, and establishes federal rules to which the state priority must conform. This is unconstitutional under state law, which requires equal access to those resources for all Alaska residents. Should the state not amend the constitution of the state of Alaska to implement the federal law, managers of federal lands in Alaska are obligated by ANILCA to implement that priority on federal lands and waters. The constitution of the state of Alaska has not been amended and on October 1, 1999 the federal government assumed management responsibilities for subsistence fisheries on all non-navigable waters on public lands and navigable and non-navigable waters within and/or adjacent to the boundaries of the federal lands. The development of regulations for subsistence fisheries under Federal management will be within the established Federal Subsistence Board (FSB) process. The public provides their input concerning regulation changes by testifying in Federal Subsistence Regional Advisory Council meetings or by becoming council members. Ten Regional Advisory Councils have been established throughout Alaska to assist the FSB in determining local subsistence issues and providing recommendations

on proposed fishing and hunting regulations on the fish and game populations under consideration. Each Regional Council meets twice a year, and subsistence users and other members of the public can comment on subsistence issues at these meetings.

### **REGION III SPORT FISH DIVISION RESEARCH AND MANAGEMENT STAFFING**

The Region III Sport Fish Division staff biologists are organized into a research group and a management group. The management group consists of a management supervisor, an area biologist for each of the six management areas, one or more assistant area management biologists, and two stocked water biologists. The area biologists evaluate fisheries and propose and implement management strategies through plans and regulation in order to meet divisional goals. A critical part of these positions is interaction with the BOF, advisory committees, and the general public. The stocked waters biologists plan and implement the regional stocking program for recreational fisheries. There is an access coordinator to administer the regional fishing and boating access program, who is also the assistant area biologist assigned to the Region III headquarters office in Fairbanks. The access coordinator has an assistant who manages the construction and mapping components of the access program. An information officer was added to the Region III Sport Fish Division staff in 2000, and charged with the responsibility of organizing and upgrading the sport fishery outreach and information programs.

The research group consists of a research supervisor, research biologists (eight in 2001), and various field technicians. The research biologists plan and implement fisheries research projects in order to provide information needed by the management group to meet divisional goals. The duties of the management and research biologists overlap somewhat.

### **STATEWIDE HARVEST SURVEY**

Sport fishing effort and harvest of sport fish species in Alaska has been estimated and reported annually since 1977 using a mail survey (Mills 1979-1994; Howe et al. 1995-2000, Walker et al. *In prep*). In recent years, two types of questionnaires were mailed to a stratified random sample of households containing at least one individual who purchased a sport fishing license (resident or non-resident) or possess a valid permanent fishing license. Information gathered from the surveys includes participation (number of anglers, trips, and days fished), number of fish caught and number harvested by species and site. These surveys estimate the number of angler-days of fishing effort expended by sport anglers fishing Alaskan waters as well as the sport harvest. Beginning in 1990, the survey was modified to include estimation of catch (release plus harvest) on a site-by-site basis. The survey is designed to provide estimates of effort, harvest, and catch on a site-by-site basis. It was not designed to provide estimates of effort directed towards a single species and species-specific catch-per-unit-effort (CPUE) information can seldom be derived from the report. The survey results for each year are not available until the following year; hence the results for 2001 are generally not available until fall 2002. Additionally, creel surveys have been selectively used to verify the mail survey for fisheries of interest, or for fisheries that require more detailed information or inseason management.

The following guidelines (Mills and Howe 1992) have been provided to evaluate the utility of statewide survey estimates, which is dependent on the number of responses for a given site:

- Other than to document that sport fishing occurred, estimates based on fewer than 12 responses should not be used,

- Estimates based on 12 to 29 responses can be useful in indicating relative orders of magnitude and for assessing long-term trends,
- Estimates based on 30 or more responses are generally usable.

In general, estimates from smaller fisheries with low participation are less precise than those of larger fisheries with high participation.

## **SECTION I: MANAGEMENT AREA OVERVIEW**

### **MANAGEMENT AREA DESCRIPTION**

The upper Copper River-upper Susitna River sport fish management area consists of all waters and drainages of the Copper River upstream from a line crossing the Copper River between the south bank of the mouth of Haley Creek and the south bank of the mouth of Canyon Creek in Wood Canyon, and all waters and drainages of the upper Susitna River upstream from the confluence of the Oshetna River (Figure 2). Located within the UCUSMA are the communities of Glennallen, Gulkana, Gakona, Chitina, McCarthy, Kenny Lake, Copper Center, Paxson, Mentasta, and Slana. Three of the state's major highways (Edgerton, Glenn and Richardson), together with numerous secondary roads and trails, provide good access to most of the area's sport fisheries. Float-equipped aircraft are commonly used during the summer to access the area's many remote lake and stream fisheries not accessible by road. Snow machines are the popular mode of travel to remote fisheries in the winter. Principal land managers in the UCUSMA are the National Park Service (Wrangell-St. Elias National Park), Bureau of Land Management (Gulkana Wild River), Ahtna Incorporated, and the Alaska Department of Natural Resources.

Regulations governing the sport fisheries in the UCUSMA are found in Chapter 52 of Title 5 of the Alaska Administrative Code (AAC 2002) and regulations regarding the personal use fisheries are found in Chapter 77; subsistence fisheries regulations are found in Chapter 01. Effort and harvest statistics for UCUSMA fisheries are reported in the statewide harvest survey (SWHS) by Mills (1979-1994), Howe et al. (1995-2000) and Walker et al. (*In prep*), under the heading "Glennallen Area" (Area I).

Management and research of UCUSMA sport and subsistence fisheries are directed from the Fairbanks and Glennallen area offices of the Alaska Department of Fish and Game. In 1997, management responsibility of the UCUSMA was transferred from Region II, headquartered in Anchorage, to Region III, headquartered in Fairbanks. The area management biologist and assistant area management biologist are stationed in Glennallen. A permanent full-time program technician is also stationed in Glennallen. This assistant is shared with the Division of Wildlife Conservation. Research biologists based in Fairbanks conduct several research projects within the area. The professional staff is assisted by numerous seasonal technicians and biologists (based in Glennallen and Fairbanks) whose employment ranges from 2 to 10 months. Expertise on experimental design is provided to the area staff by the Division of Sport Fish, Research and Technical Services staff stationed in Fairbanks and Anchorage.



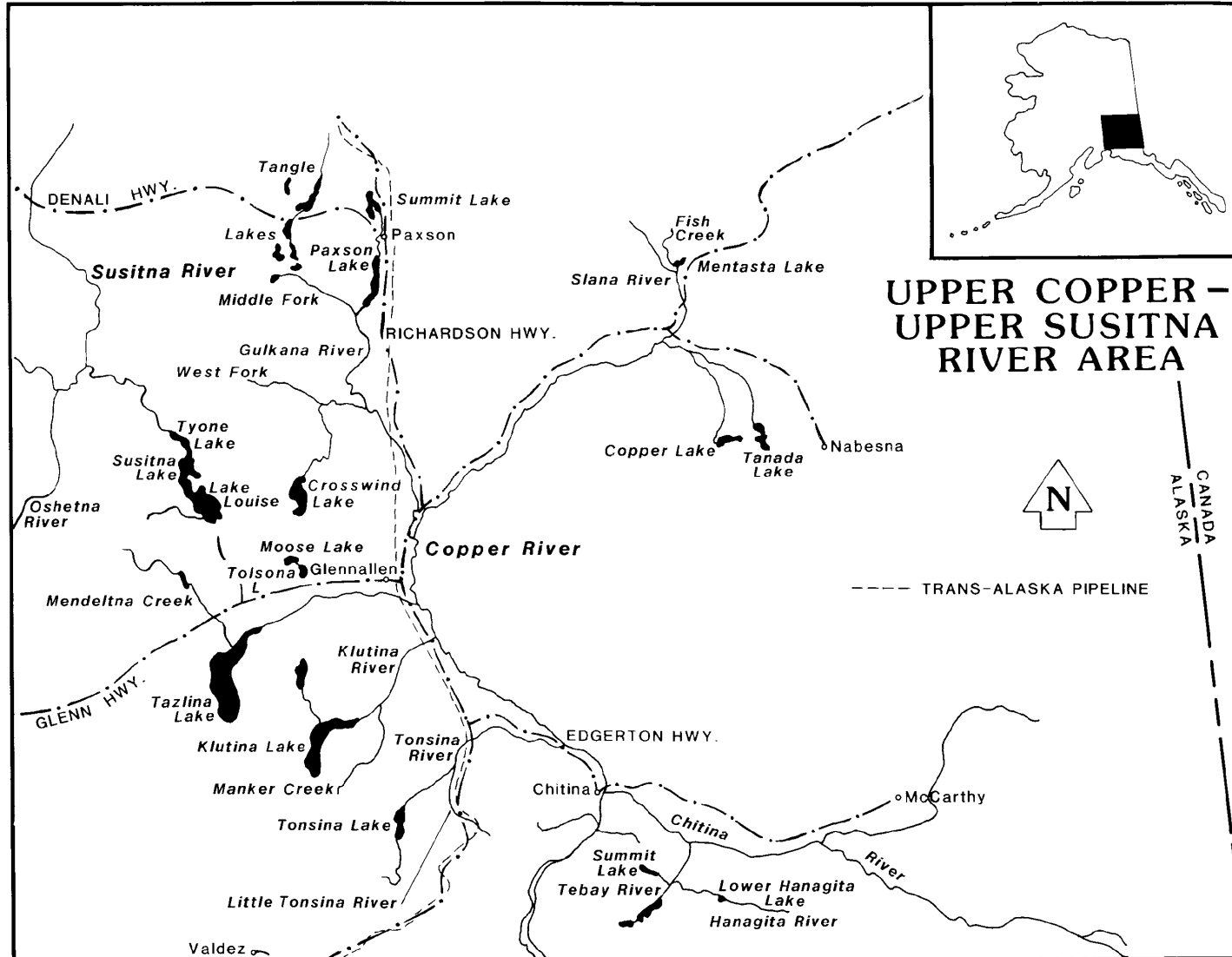


Figure 2.-The Upper Copper/Upper Susitna Management Area (UCUSMA).

## **FISHERIES RESOURCES**

The UCUSMA offers a unique blend of freshwater fishing opportunities to sport anglers and subsistence participants. Three species of Pacific salmon (chinook *Oncorhynchus tshawytscha*, coho *O. kisutch*, and sockeye *O. nerka*) are available to anglers fishing the upper Copper River drainage. The upper Susitna River drainage has no anadromous salmon. A velocity barrier in Devil's Canyon prevents upstream migration in the Susitna River. Anglers can also target coho salmon stocked in several landlocked lakes of the UCUSMA.

Popular fisheries also occur on the area's resident stocks of Arctic grayling *Thymallus arcticus*, burbot *Lota lota*, Dolly Varden *Salvelinus malma*, rainbow and steelhead trout *O. mykiss*, and lake trout *Salvelinus namaycush*. Smaller fisheries occur on the area's resident stocks of whitefish *Coregonus* and *Prosopium* spp.

Currently, twenty-seven lakes in the UCUSMA are stocked with Arctic grayling, rainbow trout, coho salmon, and Arctic char *S. alpinus*. The stocked fish are reared at state-owned hatcheries on Fort Richardson and Elmendorf Air Force Base in Anchorage. The stocked-lake fisheries provide additional and diversified angling opportunity and reduce harvest pressure on wild fish stocks.

A sockeye salmon hatchery operated by Prince William Sound Aquaculture Corporation (PWSAC) is located in the upper Gulkana River near the community of Paxson. Egg-takes are conducted near the hatchery and overwinter incubation is accomplished at the hatchery. Fry are subsequently released at Crosswind, Paxson and Summit lakes. The returning adults are harvested within commercial, subsistence, and sport fisheries.

## **OTHER USER GROUPS**

Returns of salmon to the Copper River support commercial fisheries in the Copper River District. From 1995 through 1999, an average of 1,921,573 sockeye salmon and 60,752 chinook salmon were commercially harvested in the Copper River District (Sharp et al. 2000; Table 1). Within this period, both sockeye (1997) and chinook (1998) harvests were the highest on record.

The Board of Fisheries (BOF) has established three subsistence salmon fisheries in the upper Copper River. The Division of Sport Fish currently has the lead management responsibility for these fisheries (as opposed to Commercial Fisheries Division which manages most of the State subsistence fisheries).

From 1995 through 1999, an average of 189,702 salmon were harvested annually in these fisheries (Table 2). Sockeye salmon have comprised about 95% of the total catch. These fisheries are described in detail in a separate section of this report, and thus will not be described further here.

## **ALASKA BOARD OF FISHERIES ACTIVITIES**

The development of regulations for fisheries in the UCUSMA occurs within the established Alaska Board of Fisheries (BOF) process. The public provides their input concerning regulation changes and allocation by various means including testifying directly to the BOF, by participating in local fish and game advisory committee meetings, or by becoming members of local fish and game advisory committees.

**Table 1.-Commercial harvests of chinook and sockeye salmon in the Copper River District, 1977-2002.**

<b>Year</b>	<b>Chinook Harvest</b>	<b>Sockeye Harvest</b>
1977-1988 <sup>a</sup>	32,545	633,351
1989	30,863	1,025,923
1990	21,702	844,778
1991	34,787	1,206,811
1992	39,810	970,938
1993	29,727	1,398,234
1994	47,061	1,152,220
1995	65,675	1,271,819
1996	55,646	2,356,365
1997	51,273	2,955,431
1998	68,827	1,341,692
1999	62,337	1,682,559
2000	31,259	880,334
2001	39,524	1,323,577
2002	38,734	1,248,503
<b>1990-1999<sup>a</sup></b>	<b>47,685</b>	<b>1,518,085</b>
<b>1995-1999<sup>a</sup></b>	<b>60,752</b>	<b>1,921,573</b>

<sup>a</sup> Average value for the years depicted.

**Table 2.-Reported subsistence (Glennallen and Chitina Subdistricts) harvests of chinook, sockeye, and coho salmon in the Copper River, 1977-2002.**

Year	Chinook	Sockeye	Coho	Total
1977-1988 <sup>a</sup>	2,970	54,638	796	<b>58,404</b>
1989	2,913	80,557	890	<b>84,360</b>
1990	3,221	94,001	1,544	<b>98,766</b>
1991	5,164	111,788	3,477	<b>120,429</b>
1992	4,705	127,670	1,817	<b>134,192</b>
1993	4,037	138,211	1,428	<b>143,676</b>
1994	5,423	153,049	1,958	<b>160,430</b>
1995	6,330	125,573	5,547	<b>137,450</b>
1996	4,881	141,337	3,817	<b>150,035</b>
1997	7,798	224,499	334	<b>232,631</b>
1998	8,334	195,567	2,607	<b>206,508</b>
1999	8,807	209,917	3,160	<b>221,884</b>
2000	7,819	161,570	4,051	<b>173,440</b>
2001	6,176	200,421	3,486	<b>210,083</b>
2002 <sup>b</sup>	3,105	62,881	962	<b>66,948</b>
<b>1990-1999<sup>a</sup></b>	<b>5,870</b>	<b>152,161</b>	<b>2,569</b>	<b>160,600</b>
<b>1995-1999<sup>a</sup></b>	<b>7,230</b>	<b>179,379</b>	<b>3,093</b>	<b>189,702</b>

<sup>a</sup> Average value for the years depicted.

<sup>b</sup> Preliminary reported harvest with less than 50% of permits returned.

### **Advisory Committees**

Advisory committees have been established throughout Alaska to assist the BOF in assessing the effects of fisheries issues and proposed regulations on communities local to the resource under consideration. Most active committees meet at least once each year, usually in the fall prior to scheduled BOF meetings. Staff from the Division of Sport Fish and other divisions are often invited to attend the committee meetings. In this way, advisory committee meetings allow the public to interact with the staff involved with resource issues of local concern. Within the UCUSMA there are three advisory committees that serve resource users of the area, these are the Tok Cutoff/Nabesna Road, Copper Basin, and Paxson advisory committees. In addition, the Copper River/Prince William Sound (Cordova), Fairbanks, Delta Junction, Mat-Su (Palmer/Wasilla), Upper Tanana-Forty Mile (Tok) and Anchorage advisory committees often comment on proposals concerning Copper River fisheries.

### **Recent Board of Fisheries Actions**

Under the current operating schedule, the BOF meets on a 3-year cycle. Proposals regarding UCUSMA fisheries were heard during the 1996 BOF meeting in Cordova. Several major changes regarding the management of chinook salmon, resident species, and the personal use fisheries in the UCUSMA were passed by the BOF during this meeting (Taube 2000). Agenda change requests regarding the Chitina Subdistrict personal use fishery and Tonsina River sport fishing regulations were addressed at BOF meetings in Anchorage in spring 1998 and 1999, respectively.

In December 1999 at its meeting in Valdez, the BOF addressed 29 proposals regarding UCUSMA sport and personal use fisheries. Changes as a result of BOF rulings are summarized below. Under personal use/subsistence regulations the BOF ruled in favor of a positive customary and traditional use finding for the salmon stocks of the Chitina Subdistrict of the Upper Copper River. This subdistrict encompassed the existing Copper River personal use salmon dipnet fishery. As a result of this decision, the Copper River personal use salmon dipnet fishery was repealed and a Chitina Subdistrict subsistence fishery was established. The regulations for the Chitina Subdistrict subsistence fishery are similar to the Copper River personal use salmon dipnet Fishery regulations with three exceptions. These include: 1) annual bag limits will continue to be 30 salmon for a household of two or more, and 15 salmon for a household of one, of which only one fish can be a chinook salmon. The BOF determined that reducing the bag limit of chinook salmon from four in the personal use fishery to one in the subsistence fishery, provided for a reasonable opportunity to harvest a chinook salmon, but would also maintain chinook salmon harvests at historic levels; 2) based upon recent harvests the board determined that 100,000–150,000 salmon were necessary for subsistence needs to be met for the Chitina subdistrict fishery. This number included contributions of hatchery fish, and after this contribution was subtracted, resulted in the 85,000 – 130,000 wild stock harvest level; and 3) as a subsistence fishery, there is no regulatory requirement for possessing a valid sport fishing license to participate in the fishery.

There were three sport fish regulation changes specific to chinook salmon, within the Copper River drainage; 1) a reduction of the seasonal bag limit from five to four, 2) allow for sport fish guiding on Tuesdays, and 3) permit guides to fish while guiding however they cannot retain a chinook salmon while guiding. In addition, the BOF gave additional inseason authority to managers of the Copper River commercial and sport fisheries to reduce chinook harvests when chinook salmon returns are low or are delayed due to environmental conditions.

Specific to the Gulkana River chinook salmon sport fishery there was a change in the regulation for the area downstream of the Richardson Highway bridge to the Copper River. This change clarified the existing regulation for the period June 1 to July 31, when only single-hook artificial flies are permitted by specifying hook size and distance that additional weight may be from the fly. The new regulation states that the hook gap may not exceed  $\frac{3}{4}$  inch between point and shank and weight may only be used 18 inches or more ahead of the fly. The board also passed a proposal that provides protection for rainbow trout and steelhead on the Gulkana River, but may have some impacts on chinook salmon anglers on the upper Gulkana River. The new regulation permits only unbaited, single-hook artificial lures in all flowing waters of the Gulkana River drainage with two exceptions: 1) the single-hook, artificial fly area from June 1 to July 31; and, 2) the mainstem Gulkana River upstream of the Richardson Highway bridge to an ADF&G marker 7  $\frac{1}{2}$  miles upstream of the confluence with the west fork from June 1 to July 19. This regulation permits bait in the main chinook salmon fishing area of the Gulkana River during the open season. This same protection was provided for rainbow trout and steelhead in the flowing waters of the upper Copper River drainage with the exception of Klutina River drainage and other Copper River tributaries as provided in the regulations. The Klutina River was excluded from this coverage to permit the use of bait for the popular chinook salmon and Dolly Varden fisheries that occur in that system.

Only one change regarding sockeye salmon sport fishing was passed. From August 1 to December 31, the bag and possession limit for sockeye salmon increased from 3 to 6 fish on the West Fork Gulkana upstream of a department marker located  $\frac{1}{2}$  mile upstream of the confluence with the mainstem Gulkana River. This permitted anglers to target surplus sockeye salmon produced at the Gulkana hatchery returning to the Crosswind Lake release site, while not impacting wild sockeye salmon stocks.

There are several changes to the rainbow trout and steelhead regulations in the area. The bag and possession limit for rainbow trout and steelhead in **all lakes and flowing waters** of the upper Copper River and upper Susitna River drainage is two, unless stated otherwise for a given lake or stream (for example, the Gulkana River would remain catch and release for rainbow and steelhead trout). As stated above, only unbaited, single hook artificial lures may be used in all **flowing waters** of the upper Copper River drainage, with the exception of the Klutina River drainage and other tributaries specifically listed in the regulations. The entire Hanagita River drainage and the portion of the Tebay River downstream of its confluence with the Hanagita River became catch and release only for rainbow trout and steelhead. The final change to rainbow trout regulations involved Summit Lake in the Tebay River drainage. The bag and possession limit for rainbow trout is now 10 per day, with a maximum size limit of 12 inches. The open season is from July 1 to May 31.

Regarding burbot, there were two changes in the regulations for the upper Copper River drainage. The existing Copper River personal use burbot fishery was repealed. Burbot may be harvested on the Copper River mainstem with unattended setlines, with a bag and possession limit of two burbot per day. The total number of hooks used may not exceed two, and each hook is a single hook with a gap between point and shank larger than  $\frac{3}{4}$  inch, and is set to rest on the river bottom. Each line must be identified with the angler's name and address and must be physically inspected at least once every 24-hours. The second change was a reduction in bag and possession limit for burbot at Moose and Tolsona lakes from five to two.

Only one change occurred in the Arctic grayling regulations for the upper Copper River drainage. The bag and possession limit for Arctic grayling on Mendeltna Creek was reduced from five to two, with a minimum size limit of 12 inches. The open season was set from June 1 to March 31, to offer protection during the spawning season.

### **Emergency Order Authority**

To address conservation concerns and to implement BOF adopted management plans, the department has emergency order authority (AAC 2002b) to modify time, area, and bag/possession limit regulations. Emergency orders issued under this authority during 2000 are summarized in Table 3.

### **FEDERAL SUBSISTENCE**

On October 1, 1999 the Federal government assumed management responsibilities for subsistence fisheries on all non-navigable waters on public lands and navigable and non-navigable waters within and/or adjacent to the boundaries of the wild-designated portion of the Gulkana River, and Wrangell-St. Elias National Park. The upper Copper River subsistence salmon fisheries are the fisheries within the UCUSMA primarily affected by the change in management responsibilities. The development of regulations for subsistence fisheries under Federal management will be within the established Federal Subsistence Board (FSB) process. The public provides their input concerning regulation changes by testifying in Federal Subsistence Regional Advisory Council meetings or by becoming council members. Regional advisory councils have been established throughout Alaska to assist the FSB in determining local subsistence issues and providing recommendations on proposed fishing and hunting regulations on the fish and game populations under consideration. The UCUSMA fisheries fall under the purview of the Southcentral Regional Advisory Council. The council meets twice each year, usually in the fall and late winter, the most recent meeting was held October 2-4, 2002 in Cordova. At this meeting, thirteen Federal fisheries proposals for the Prince William Sound Area (including Federal waters in the Upper Copper River drainage) were addressed and Council recommendations were forwarded to the Federal Subsistence Board. Staff from the Division of Sport Fish and other divisions are invited to attend the council meetings and present data to the council regarding wildlife and fisheries issues within the councils responsibility.

### **STATEWIDE HARVEST SURVEY**

Effort and harvest statistics for UCUSMA fisheries are reported in the SWHS by Mills (1979-1994), Howe et al. (1995-2000), and Walker et al. (*In prep*) under the heading "Glennallen Area" (Area I). Beginning in 1990, the survey was modified to include estimation of catch (release plus harvest) on a site-by-site basis. The SWHS is an annual postal survey of license holders conducted to estimate sport fishing participation (effort), harvest and catch statewide by fisheries, areas, regions, and species.

### **ECONOMIC SURVEYS**

The economic value of specific management changes regarding the chinook salmon fishery on the Gulkana River were examined via survey in 1993 (Layman et al. 1996). The four management options surveyed were: 1) status quo, no regulatory change; 2) doubling the harvest; 3) double the daily bag limit; 4) seasonal bag limit of five chinook. The results of the survey suggest that the seasonal bag limit provided the greatest net economic benefit, followed by option 2, option 3 and option 1. In 1994, a seasonal bag limit of five chinook salmon was adopted by the BOF for the upper Copper River drainages.

**Table 3.-Emergency orders issued for UCUSMA sport and subsistence fisheries during 2000.**

Year	E. O. Number	Explanation
2000	3-KS-01-00	Reduces the seasonal bag limit for chinook salmon 20 inches or more in length in the Upper Copper River drainage from 4 to 2 per season. Effective June 26, 2000.
2000	3-RS-01-00	Establishes the schedule for the subsistence dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River through August 31, 2000. The Chitina Subdistrict will be open from 8:00 A.M. until 8:00 P.M. Saturday June 10, and will be closed from Sunday June 11 through Thursday June 15, and potentially reopen 12:00 P.M. Thursday June 15 until 8:00 P.M. Sunday June 18.
2000	3-RS-02-00	Changes the schedule for the subsistence dip net salmon fishery in the Chitina Subdistrict of the upper Copper River for the period from June 12 – 18. The Chitina Subdistrict will be open from noon Thursday June 15 until 8:00 P.M. Sunday June 18, and potentially reopen 8:00 A.M. Tuesday June 20 until 8:00 P.M. Sunday June 25.
2000	3-RS-03-00	Changes the schedule for the subsistence dip net salmon fishery in the Chitina Subdistrict of the upper Copper River for the period from June 19 – 25. The Chitina Subdistrict will be open from noon Thursday June 22 until 8:00 P.M. Sunday June 25, and potentially reopen 8:00 A.M. Tuesday June 27 until 8:00 P.M. Wednesday July 5.
2000	3-RS-04-00	Changes the schedule for the subsistence dip net salmon fishery in the Chitina Subdistrict of the upper Copper River for the period from June 26 – July 2. The Chitina Subdistrict will be open from 8:00 A.M. Wednesday June 28 until midnight Sunday July 2, and potentially remain open through 8:00 P.M. Wednesday July 5.
2000	3-RS-05-00	<p>Changes the schedule for the subsistence dip net salmon fishery in the Chitina Subdistrict of the upper Copper River for the period July 3 – August 31. The Chitina Subdistrict will be open from 12:00 A.M. Monday July 3 until midnight Thursday August 31. After August 31, the fishery will remain open, by regulation, through September 30.</p> <p>In addition, this emergency order establishes the weekly period when a supplemental permit for 10 additional sockeye salmon will be valid for the subsistence dip net salmon fishery in the Chitina Subdistrict of the upper Copper River. Sonar counts at Miles Lake from June 19 - 26 exceeded the weekly escapement objective by over 55,600 fish. Based on migration timing studies, this surplus beyond escapement needs will be present within the Chitina Subdistrict from approximately July 10 – 16. Supplemental permits are now incorporated in the Chitina Subdistrict fishery permit and supplemental harvest must be recorded on this permit, before leaving the fishing site. The supplemental harvest portion of the permit is valid only if the original permit limit of 15 or 30 salmon has been filled, and may only be taken from 12:00 A.M. July 10 to 11:59 P.M. July 16.</p>
2000	3-RS-06-00	Establishes a weekly fishing period for the Batzulnetas area subsistence salmon fishery. The weekly fishing period will be 48-hours in duration from 12:00 noon Friday to 12:00 noon Sunday, beginning Friday June 2, 2000. On June 30, the weekly fishing period will be 84-hours in duration from 12:00 noon Friday to 12:00 midnight each week until September 1, or until closed by emergency order.

-continued-



**Table 3.—Page 2 of 3.**

2001	3-RS-01-01	<p>Establishes the schedule for the subsistence dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River through August 31, 2001. The Chitina Subdistrict will be open from 8:00 A.M. Monday June 4 until 8:00 P.M. Sunday June 10, and will be closed from Monday June 11 through Thursday June 14, and potentially reopen 12:00 noon Thursday June 14 until midnight Sunday June 17.</p> <p>In addition, this emergency order establishes the weekly period when a supplemental permit for 10 additional sockeye salmon will be valid for the subsistence dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River. Sonar counts at Miles Lake from May 21-27 exceeded the weekly escapement objective by over 67,000 fish. Based on migration timing studies, this surplus beyond escapement needs will be present within the Chitina Subdistrict from approximately June 4-10. Supplemental permits are now incorporated in the Chitina Subdistrict fishery permit and supplemental harvest must be recorded on this permit, before leaving the fishing site. The supplemental harvest portion of the permit is valid only if the original permit limit of 15 or 30 salmon has been filled, and supplemental sockeye salmon may only be taken from 8:00 A.M. June 4 to 8:00 P.M. June 10.</p>
2001	3-RS-02-01	<p>Changes the schedule for the subsistence dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period from June 11-17, 2001. The Chitina Subdistrict will be open from 12:01 A.M. Monday June 11 until midnight Sunday June 17, and potentially reopen Monday June 18, 12:01 A.M. to Sunday June 24, midnight.</p> <p>In addition, this emergency order establishes the weekly period when a supplemental permit for 10 additional sockeye salmon will be valid for the subsistence dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River. Sonar counts at Miles Lake from May 28-June 3 exceeded the weekly escapement objective by over 60,000 fish. Based on migration timing studies, this surplus beyond escapement needs will be present within the Chitina Subdistrict from approximately June 11-17. The supplemental harvest portion of the permit is valid only if the original permit limit of 15 or 30 salmon has been filled, and supplemental sockeye salmon may only be taken from 12:01 A.M. June 11 to midnight June 17.</p>
2001	3-RS-03-01	<p>Changes the schedule for the subsistence dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period from June 18-24, 2001. The Chitina Subdistrict will be open from 12:01 A.M. Monday June 18 until midnight Sunday June 24, and potentially reopen Monday June 25, 12:01 A.M. to Sunday July 1, midnight.</p>
2001	3-RS-04-01	<p>Changes the schedule for the subsistence dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period from June 25-July 1, 2001. The Chitina Subdistrict will be open from 12:00 noon Tuesday June 26 until midnight Sunday July 1, and potentially reopen Monday July 2, 12:01 A.M. to Wednesday July 4, 8:00 P.M. and reopen Friday July 6, 8:00 A.M. to Sunday July 8, 8:00 P.M.</p>
2001	3-RS-05-01	<p>Changes the schedule for the subsistence dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period from July 2-8, 2001. The Chitina Subdistrict will be open from 12:01 A.M. Monday July 2 until midnight Wednesday July 4, and reopen 12:00 noon Friday July 6 to 8:00 P.M. Sunday July 8, and potentially reopen 12:00 noon Wednesday July 11 to 8:00 P.M. Sunday July 15.</p>

---

-continued-

**Table 3.-Page 3 of 3.**

---

2001	3-RS-06-01	Establishes a weekly fishing period for the Batzulnetas area subsistence salmon fishery. On July 1, the weekly fishing period will be 84-hours in duration from 12:00 noon Friday to 12:00 midnight Monday each week until September 1, or until closed by emergency order.
2001	3-RS-07-01	Changes the schedule for the subsistence dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period from July 9-August 31. The Chitina Subdistrict will be open from 12:01 A.M. July 9 until midnight Friday August 31. After August 31, the fishery will remain open, by regulation, through September 30.

---

The estimated net economic value of the upper Copper River personal use and subsistence fisheries were calculated based upon the permit and harvest database from 1990 using the travel cost method (TCM; Jones 1998). The average value of the fishery to the participant per permit in 1990 was estimated at approximately \$47, with 95% confidence limits of \$31 and \$114. Values varied dependent on the distance traveled to participate in the fisheries.

## **SPORT FISHING EFFORT**

Due to a computational problem (discovered in 1999), the estimates of effort, catch, and harvest for 1995 – 1998 produced by RTS were incorrect. RTS has recomputed the estimates for 1996, 1997, and 1998, and all of the tables within this report have been corrected to reflect the recalculated values of effort, catch and harvest. The electronic file containing data for 1995 was lost and the data will never be corrected.

The following summary of sport angler effort in the UCUSMA is based on SWHS mail survey data (Mills 1979–1994, Howe et al. 1995–2000, Walker et al. *In prep*). From 1990 through 1999 sport anglers have expended an average of 70,838 angler-days fishing UCUSMA waters, an average of 2.9% of the annual statewide sport angling effort and about 25% of the annual AYK (Region III) sport angling effort over this period (Table 4). This is a 38% increase compared to the 1977–1989 average. Recreational angler effort was relatively stable until 1991 when it began to increase and peaked in 1995 when 102,951 angler-days were expended in the UCUSMA (Figure 3). The upper Copper River drainage has supported approximately 83% of the sport effort expended in the UCUSMA from 1990 through 1999 (Table 5). In this drainage, the Gulkana River drainage has supported the vast majority of the sport angling effort. The Klutina River is the other upper Copper River drainage that supports a popular sport fishery. The major sport fishery in the upper Susitna River drainage is in the Tyone River drainage and includes Lake Louise and Susitna and Tyone lakes.

During 2000 and 2001, sport anglers fishing UCUSMA waters expended approximately 58,194 and 48,879 angler-days, respectively (Tables 4 and 5). Participation in 2000 was the lowest since 1990, while 2001 was the lowest since 1988. The recent declines were 18% less and 31% less than the recent 10-year average, for 2000 and 2001 respectively. The decline in participation during 2000 and 2001 in the UCUSMA reflects a recent decline in the area and regional sport fisheries since 1999.

## **ESTABLISHED MANAGEMENT PLANS AND POLICIES**

Some UCUSMA fisheries have been the focus of allocative conflicts. These conflicts have led the BOF to establish several management plans and policies to guide the area's fisheries. The goal of these plans is to allocate fish resources among users and to provide managers with guidelines to maintain a sustained yield of the area's fish stocks. The following management plans and policies have been adopted by the BOF for UCUSMA fish stocks and reflect actions taken by the BOF during the December 1999 meeting:

*Copper River District Salmon Management Plan* (AAC 2002b). This management plan contains spawning escapement goals for sockeye and other salmon, harvest guidelines for the subsistence and sport fisheries in the drainage, and hatchery brood stock and hatchery surplus goals. The goals are met through regulation of the commercial fishery at the mouth of the river, and are measured at the sonar counter near Miles Lake.

**Table 4.-Number of angler-days of sport fishing effort expended by recreational anglers fishing UCUSMA waters, 1977-2001.**

Year	UCUSMA Effort	Alaska Effort	% by UCUSMA	Region III Effort <sup>b</sup>	% by UCUSMA
1977-1989 <sup>a</sup>	51,268	1,763,640	2.9	233,787	21.9
1990	50,791	2,453,284	2.1	296,420	17.1
1991	64,207	2,456,328	2.6	284,129	22.6
1992	72,052	2,540,374	2.8	253,904	28.4
1993	77,870	2,559,408	3.0	298,842	26.1
1994	85,520	2,719,911	3.1	295,507	28.9
1995	102,951	2,787,670	3.7	373,092	27.6
1996	64,407	2,006,528	3.2	265,573	24.3
1997	56,257	2,079,514	2.7	238,856	23.6
1998	56,706	1,856,976	3.1	227,841	24.9
1999	77,619	2,499,152	3.1	304,522	25.5
2000	58,194	2,627,805	2.2	241,574	24.1
2001	48,879	2,261,583	2.2	194,009	25.2
<b>1990-1999<sup>a</sup></b>	<b>70,838</b>	<b>2,395,915</b>	<b>2.9</b>	<b>283,869</b>	<b>24.9</b>
<b>1995-1999<sup>a</sup></b>	<b>71,588</b>	<b>2,245,968</b>	<b>3.2</b>	<b>281,977</b>	<b>25.2</b>

<sup>a</sup> Average value for the years depicted.

<sup>b</sup> Values for Region III effort prior to 1997 are AYK and Glennallen totals combined.

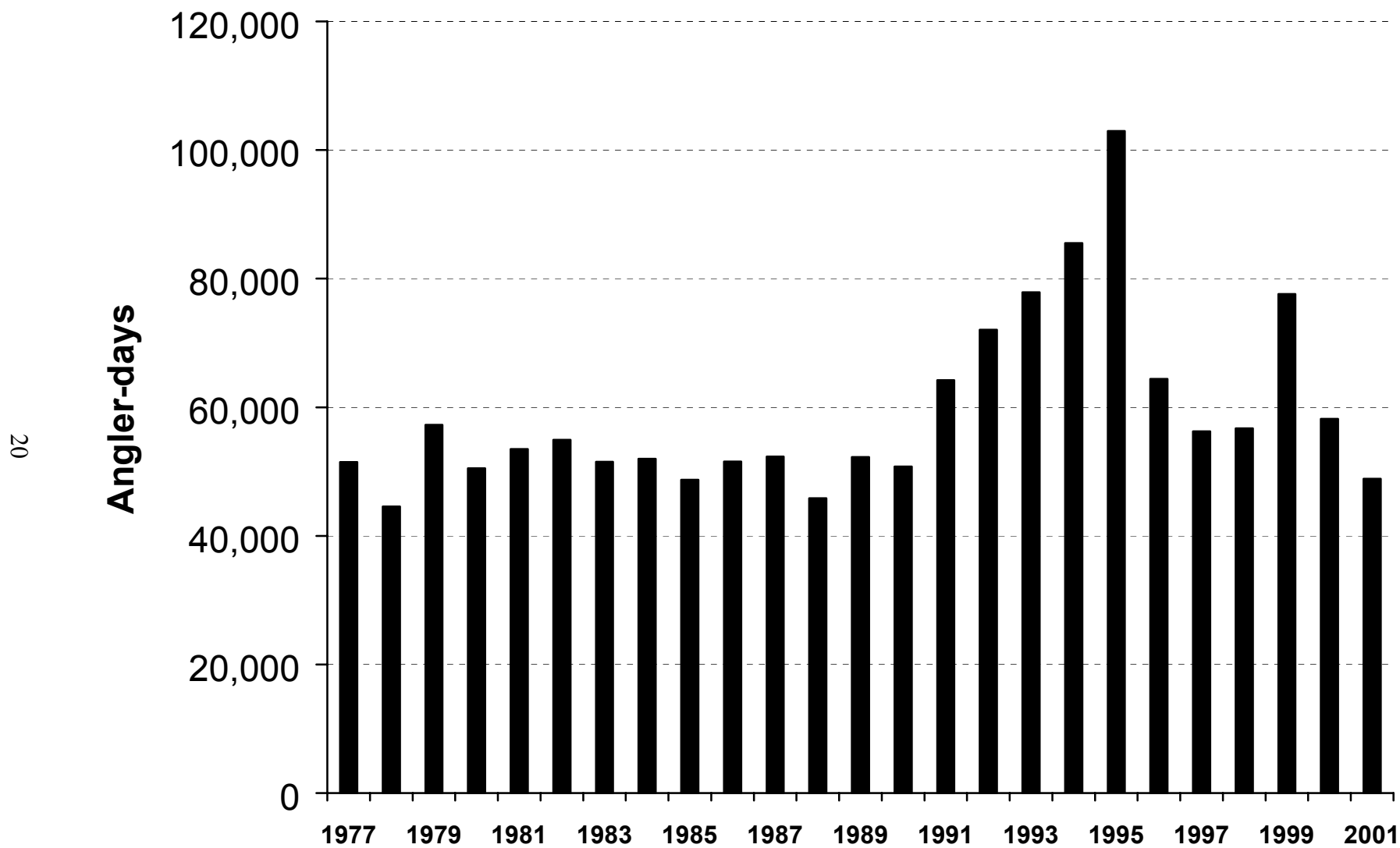


Figure 3.-Sport fish effort in the UCUSMA, 1977-2001.

**Table 5.-Sport fishing effort (angler-days) in the UCUSMA by drainage, averaged for 1977 - 1989 and annually from 1990 - 2001.**

Areas	1977-89 <sup>a</sup>	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>a</sup>	1995-1999 <sup>a</sup>
Gulkana River Drainage															
Lakes	7,617	7,172	9,047	8,795	8,302	9,074	10,559	6,298	5,254	4,560	7,907	4,825	6,188	<b>7,697</b>	<b>6,916</b>
Streams	16,113	19,112	21,285	26,039	27,543	25,581	33,415	25,727	23,714	27,349	29,934	20,896	18,664	<b>25,970</b>	<b>28,028</b>
<b>Total</b>	<b>23,730</b>	<b>26,284</b>	<b>30,332</b>	<b>34,834</b>	<b>35,845</b>	<b>34,655</b>	<b>43,974</b>	<b>32,025</b>	<b>28,967</b>	<b>31,909</b>	<b>37,841</b>	<b>25,721</b>	<b>24,852</b>	<b>33,667</b>	<b>34,943</b>
Upper Susitna Drainage															
Lakes	12,657	8,334	8,342	10,569	14,345	16,614	17,058	8,597	4,952	4,930	10,891	8,854	4,808	<b>10,463</b>	<b>9,286</b>
Streams	404 <sup>b</sup>	992	1,376	1,408	2,491	2,027	3,716	1,212	994	533	963	1,760	376	<b>1,571</b>	<b>1,484</b>
<b>Total</b>		<b>9,326</b>	<b>9,718</b>	<b>11,977</b>	<b>16,836</b>	<b>18,641</b>	<b>20,774</b>	<b>9,809</b>	<b>5,946</b>	<b>5,463</b>	<b>11,854</b>	<b>10,614</b>	<b>5,184</b>	<b>12,034</b>	<b>10,769</b>
Klutina River Drainage	4,636 <sup>b</sup>	5,556	12,145	6,398	8,177	10,624	14,496	10,699	11,644	9,408	15,687	11,125	8,960	<b>10,483</b>	<b>12,387</b>
Tazlina Drainage	1,340 <sup>b</sup>	2,082	2,295	3,507	3,112	3,837	4,165	1,842	1,630	1,797	1,846	1,583	864	<b>2,611</b>	<b>2,256</b>
Tonsina Drainage	971 <sup>b</sup>	498	2,072	2,240	2,901	2,254	3,912	1,514	1,099	1,054	1,230	1,182	1,100	<b>1,877</b>	<b>1,762</b>
Copper River															
Upstream of Gulkana	1,104 <sup>b</sup>	980	950	476	1,271	1,419	1,711	713	382	626	959	446	737	<b>949</b>	<b>878</b>
Copper River															
Downstream of Klutina <sup>c</sup>	736 <sup>b</sup>	537	216	1,255	728	1,778	1,402	695	922	795	403	780	548	<b>873</b>	<b>843</b>
Stocked Lakes/Streams	3,276	2,665	4,812	7,623	4,782	5,561	5,331	3,774	2,250	3,346	3,849	3,689	4,242	<b>4,399</b>	<b>3,710</b>
Other Sites															
Lakes	1,711 <sup>b</sup>	1,738	544	1,645	2,222	3,350	3,555	1,545	1,499	1,182	1,436	1,762	1,698	<b>1,872</b>	<b>1,843</b>
Streams	1,153 <sup>b</sup>	1,125	1,123	2,097	1,996	3,401	3,631	1,475	1,005	972	2,514	1,292	694	<b>1,934</b>	<b>1,919</b>
<b>Total</b>	<b>3,606<sup>b</sup></b>	<b>2,863</b>	<b>1,667</b>	<b>3,742</b>	<b>4,218</b>	<b>6,751</b>	<b>7,186</b>	<b>3,020</b>	<b>2,504</b>	<b>2,154</b>	<b>3,950</b>	<b>3,054</b>	<b>2,392</b>	<b>3,806</b>	<b>3,763</b>
<b>Area Total</b>	<b>51,268<sup>d</sup></b>	<b>50,791</b>	<b>64,207</b>	<b>72,052</b>	<b>77,870</b>	<b>85,520</b>	<b>102,951</b>	<b>64,407</b>	<b>56,257</b>	<b>56,706</b>	<b>77,619</b>	<b>58,194</b>	<b>48,879</b>	<b>70,838</b>	<b>71,588</b>

<sup>a</sup> Average value for the years depicted.

<sup>b</sup> Includes 1983-1988 average only. Prior to 1983, harvest included in "other waters".

<sup>c</sup> Not including the Tonsina drainage.

<sup>d</sup> Average of the total annual area effort for the period from 1977-1989.

*Copper River Chinook Salmon Fishery Management Plan* (AAC 2002c). This management plan provides for an escapement range of chinook salmon in the Copper River drainage of 28,000 – 55,000. Management of the commercial and sport fisheries will reduce the potential harvest by 5% to achieve this escapement range. This reduction will be achieved in the commercial fishery through closure of statistical areas during statistical weeks 20 and 21 and in the sport fishery by reduction of the seasonal bag limit from five to four chinook salmon. If additional conservation measures are necessary the department has the authority to further restrict the commercial fishery by additional closures of statistical areas during statistical weeks 20, 21, and 22. The department also has the authority to further restrict the sport fishery with any one or combination of the following: a) reduction of bag and possession limits; b) catch and release only designation; c) reduction of the seasonal limit; and d) modification of other methods and means not specified above. This plan requests the department to submit a proposal at the 2002/2003 BOF meeting recommending changes to this plan that will result in improved management for high sustained yield.

*Copper River Subsistence Salmon Fisheries Management Plan* (AAC 2002d). This management plan ensures that adequate escapement of salmon pass the sonar in the lower Copper River and that subsistence needs are met. It establishes the subsistence gear and fishing periods in the Copper River District and the management strategy, fishing periods and harvest level in the Chitina Subdistrict subsistence fishery. It also establishes the open area, gear, season, bag and possession limits, and permit requirements for a subsistence fishery near the traditional fishing village of Batzulnetas along a portion Tanada Creek and its confluence with the Copper River.

*Lake Burbot Management Plan* (AAC 2002e). This management plan stipulates that the burbot fisheries in lakes of the UCUSMA be managed to ensure maximum sustainable harvests, and provides the department the authority to use emergency orders to reduce the time or areas open to fishing and/or prohibit set lines to accomplish this management objective.

*Cook Inlet & Copper River Basin Rainbow/Steelhead Trout Management Policy*. This management policy was adopted by the BOF to provide future Boards, fisheries managers, and the sport fishing public with: (1) management policies and implementation directives for area rainbow and steelhead trout fisheries; (2) a systematic approach to developing sport fishing regulations that includes a process for rational selection of waters for special management; and (3) recommended research objectives. This management policy was never adopted as regulation.

## **MAJOR ISSUES**

The major issues associated with UCUSMA sport and subsistence fisheries are summarized below:

*Copper River Chinook Salmon*: Under the *Copper River District Salmon Management Plan* (AAC 2002b), the department is directed to manage the Copper River District commercial salmon fishery to attain a biological (spawning) escapement goal of 300,000 sockeye salmon and 17,500 other salmon (species not defined). In addition to the biological escapement goal, the commercial fishery is to be managed to achieve an inriver escapement goal of 60,000-75,000 salmon for the Glennallen Subdistrict

subsistence fishery, 100,000-150,000 salmon for the Chitina Subdistrict subsistence fishery, and 15,000 salmon for the sport fishery, and an amount of sockeye salmon determined annually for the Gulkana hatchery brood and surplus stocks. Unfortunately, there is a lack of spawner-recruit data to assess the long-term productivity of the Copper River chinook salmon return or the validity of establishing a chinook salmon spawning escapement goal. Since 1999, estimates of upper Copper River chinook salmon escapement have been obtained from a radio-telemetry research study. This information, in addition to historic aerial survey indices, resulted in a spawning escapement range of 28,000 – 55,000 chinook salmon, which was adopted by the BOF at the 1999 meeting. To assure that harvest of Copper River chinook salmon does not exceed sustainable levels, the department has been directed by BOF to develop a revised *Copper River Chinook Salmon Fishery Management Plan* (AAC 2002c) by the 2002 BOF meeting. Commercial harvests, the largest component of the annual harvest, had increased in conjunction with the area's subsistence and sport fisheries from 1995-99 raising concerns regarding sustainability of these harvest levels. The department considers the chinook salmon resources of the Copper River fully-utilized and as a result, the allocative nature of this issue will remain controversial.

*Copper River Subsistence Salmon Fisheries:* Since 1990, harvest and participation in the Glennallen and Chitina Subdistrict subsistence salmon fisheries have doubled. Both fisheries are managed under BOF-adopted management plans. Under these management plans, an escapement goal of 60,000–75,000 salmon for the Glennallen Subdistrict subsistence fishery and an escapement goal of 100,000 – 150,000 salmon for the Chitina Subdistrict subsistence fishery have been set. In 1997 and 1999, harvests in the Chitina Subdistrict fishery (in 1999 as a personal use fishery, allocation was 100,000 salmon) and the Glennallen Subdistrict fishery (60 – 75,000 salmon) exceeded the harvest guidelines. Participation in both fisheries was the second highest on record. Continued strong returns of sockeye salmon to the Copper River during the past 4 years, as well as increased media attention, are partly responsible for the record participation. The repeal of the Chitina Subdistrict as a personal use fishery, added potentially an additional 10,000 subsistence users to the upper Copper River fisheries. This has caused alarm in the commercial fishery, since the Chitina Subdistrict harvest now has a subsistence priority over the commercial harvest allocation. The Native population is also at odds against this ruling, due to the fact that they do not consider the urban dipnetters “true” subsistence users.

*Land Access:* In 1998, Ahtna Native Corporation initiated an access fee program for native-owned uplands adjacent to the Klutina River upstream of the new Richardson Highway bridge. This encompassed nearly the entire river with the exception of the lower two river miles. There is a public easement (managed by the Bureau of Land Management (BLM)) that runs parallel to the river and provides access to Klutina Lake, but it provides limited direct river access. Non-shareholders were required to pay a day use fee to access the river from the easement and also pay camping fees to camp at sites off the easement. This angered many of the sport fishing public that used the easement and Native lands to access the river and resulted in some users avoiding this access point. Ahtna Native Corporation initiated a similar access fee program at Gulkana River access points in 1999. On the Gulkana, Ahtna Native Corporation owns the majority of land downstream of Sourdough and the Gulkana River Scenic River corridor. Public access to



the lower river is limited to two public easements (Sailors Pit near Gakona and Mile 141 Richardson Highway pullout) and the Richardson Highway bridge right-of-way (ROW).

*Burbot:* The lakes of the UCUSMA have historically supported some of the largest sport fisheries for burbot in Alaska. Stock assessment work indicated that many of the larger burbot stocks in lakes were depressed due to overfishing in the early 1980s. Based on these findings, the BOF adopted a management plan for burbot stocks in UCUSMA lakes. Under this management plan, the Board has adopted a more conservative management regime for UCUSMA burbot fisheries which allows previously overfished stocks to recover enough to permit sustainable fisheries, and which protects healthy stocks from overharvest. Part of the current regulatory regime is the elimination of unattended setlines from the fishery. Many local anglers are not supportive of this action and have submitted proposals to the Board to have unattended setlines reintroduced to the fishery. Currently, ADF&G staff does not support reintroduction of unattended setline use in lakes. This gear question will likely continue to remain an issue into the future. Lake Louise remains closed to burbot fishing due to depressed burbot stocks. Lake Louise will be reopened to burbot fishing when stock assessment work shows that the burbot stocks have recovered enough to permit a sustainable fishery. Local advisory committees are supportive of this closure. The department had allowed use of unattended setlines through a personal use burbot fishery (1997-1999) and currently under conservative sport fishing regulations for the mainstem Copper River. Stock assessment in Tolsona Lake during 1996 and 1997 indicated a decline in abundance to levels below any previous estimate, and resulted in an emergency order closure of this lake to burbot fishing in 1998. This population will be discussed in detail in a later section.

*Lake Trout:* Lakes in the UCUSMA have historically supported some of the largest sport fisheries for lake trout in Alaska, with lakes of the Tyone River drainage (Lake Louise and Susitna and Tyone lakes) and Gulkana River drainage (Paxson, Summit, and Crosswind lakes) having supported the largest fisheries. Concern was raised in the late 1980s that sport harvests in some of these lakes might have been exceeding sustainable levels. As a result, an 18 inch minimum size limit was enacted for the above lakes to assure that fish could spawn at least once prior to being subject to harvest. Subsequent stock assessment work suggested that an 18 in size limit does not protect first-time spawners from harvest in these lakes. A 24-in minimum size limit for these lakes was implemented in 1994. The lake trout bag and possession limit was also reduced to one in some of the larger fishery lakes. The local advisory committees supported these actions.

## **CURRENT MANAGEMENT AND RESEARCH ACTIVITIES**

During 2000 and 2001 several research and management projects were initiated or continued.

### **Research Projects**

**Chinook Salmon** - On the Copper River mainstem, downstream of Haley Creek, the second and third years of a three-year study was conducted to determine inriver abundance, spawning distribution and migratory timing of chinook salmon in the upper Copper River (Wuttig and Evenson, 2001). This was accomplished through the capture of chinook salmon with dipnets which were then implanted with radio transmitters. Nine radio-telemetry tracking stations determined when fish entered and left the Chitina Subdistrict dip net fishery, and entered either four spawning tributaries (Gulkana, Tazlina, Klutina, and Tonsina river drainages), the upper

Copper River (upstream of the Gakona River), or the Chitina River drainage. Tracking flights were conducted over the spawning tributaries to gain additional spawning distribution information not collected by the tracking stations. Abundance was estimated using chinook salmon captured during the sampling for radio transmitter implantation as the marking event and the harvest in the Chitina Subdistrict fishery as the recapture event. The resulting estimate is used to determine if chinook spawning escapement for the Upper Copper River is within the range specified in the revised *Copper River Chinook Salmon Fishery Management Plan*. Partial funding for this project was obtained through the Office of Subsistence Management, and it was continued in 2002.

In 2001, coded-tag recovery in the Copper River District commercial fishery was initiated. A tagging study was initiated in 1997 to determine if returning chinook salmon from four Copper River stocks had the same exploitation rate within the commercial fishery. From 1997-1999, juveniles were captured and implanted with coded wire tags, and released in four Upper Copper River tributaries (East Fork Chistochina, Gulkana, Klutina, and Tonsina rivers). In 2001, only 7 individuals from Copper River stock tag releases were identified. Catch screening continued in 2002.

**Rainbow/Steelhead trout** - Two rainbow/steelhead trout projects were conducted during 2000 in the UCUSMA (Fleming *In prep*). Both of these were conducted on the Gulkana River. Preliminary work for establishing a weir site on the Middle Fork downstream of Dickey Lake to enumerate rainbow trout and steelhead spawners was conducted in spring 2000. The second involved the radio-tagging of resident rainbow trout in the Gulkana River drainage to locate spawning grounds. Rainbow trout over 20 inches in length were captured and implanted with radio-tags during the summer of 2000 and then tracked during spring 2001 to locate new spawning areas. In spring 2001, the weir was installed downstream of Dickey Lake and operated throughout the spawning period. In fall 2001, a weir was installed at Hanagita Lake in the Tebay River drainage to enumerate migrating steelhead. Both weir projects continued in 2002.

**Burbot** - The burbot research program conducted stock assessment in 2000 on Tolsona Lake and in 2001 at Tolsona, Paxson, and Sucker lakes (Taube and Bernard *In prep*). Tolsona Lake has been sampled annually since 1986 and was recently closed to sport fishing in spring 1998 due to a population decline. Estimates of abundance, CPUE and length composition were collected at Tolsona Lake, while estimates of CPUE and length composition were collected at Paxson and Sucker lakes. Sampling in Tolsona Lake occurred in June, while Paxson and Sucker lakes were sampled in September. As a result of the burbot research program, the department submitted a proposal to close Tolsona Lake to burbot fishing, as the population will not reach sustainable levels prior to the next Board cycle.

### **Management Projects**

**Chinook/Sockeye salmon** - Two management projects were continued in 2000 and 2001: 1) biological catch sampling of the Chitina Subdistrict Subsistence Salmon Fishery and 2) aerial surveys of the nine chinook salmon spawning escapement index streams. Sampling of the Chitina Subdistrict subsistence fishery occurred from the opening of the fishery in June through the majority of the sockeye run ending in mid to late August. Length and age data of sockeye and chinook salmon harvested in the fishery were collected. All chinook and sockeye salmon sampled were examined for missing adipose fins that indicate the presence of a coded-wire tag implanted as the fry were released from the Gulkana River hatchery. The heads of these salmon are collected, scanned at the Coded-Wire Tag Lab in Juneau and the collected data are used to

estimate hatchery contribution to the Copper River sockeye salmon run and for input into chinook salmon CWT study database.

In 2000 and 2001, aerial surveys on the nine index streams including the Gulkana River were flown in late July and early August for comparison to historic survey indices as a measure of chinook salmon run strength. Due to poor survey conditions in both years, the aerial surveys were flown outside of the preferred survey “window”.

### **ACCESS PROGRAMS**

The Wallop-Breaux amendment to the Federal Aid in Sport Fish Restoration Act mandates that at least 12.5% of the federal funds collected from taxes on sport fishing equipment be used by the states for the development and maintenance of boating access facilities. A broad range of access facilities can be approved for funding if they are constructed to achieve a state fishery management objective. These facilities can include boat ramps and lifts, docking and marina facilities, breakwaters, fish cleaning stations, rest rooms, and parking areas. In spite of the large land base in the UCUSMA, access to sport fishing is restricted near most popular fisheries. The causes for limited access are several: much of the land in the area is private, few roads and trails exist, and suitable launches for boats are scarce. Various small access projects were completed in 2000 and 2001 in the UCUSMA, which entailed improving existing trails and replacing or installing signs for local roadside lakes. Preliminary work was begun on a four-mile trail to Tolsona Mountain Lake, a remote stocked lake, in 1999, which entailed locating the optimum site for the trail and determining land status. Trail clearing was conducted for ten days each year in 2000 and 2001, with approximately one and one-half miles of trail being cleared during each year.

### **INFORMATION AND EDUCATION**

Information regarding regulations, publications, stocking and fishing reports, news releases and emergency orders for the UCUSMA can be found at the Department of Fish and Game website ([www.state.ak.us/local/akpages/FISH.GAME](http://www.state.ak.us/local/akpages/FISH.GAME)). In addition, many of these publications as well as some additional publications regarding fishing opportunities in the UCUSMA can be found at the area ADF&G office in Glennallen and the regional ADF&G office in Fairbanks. Information regarding the Gulkana Wild River (BLM) and Wrangell-St. Elias National Park (USNPS) can be obtained from the respective agency offices in Glennallen and Copper Center. The Ahtna Native Corporation has its headquarters located in Glennallen and can be visited for information regarding access to native lands. The Greater Copper Valley Chamber of Commerce can be a source for commercial operators located in the UCUSMA. A listing of the addresses and contact numbers for these information sources can be found in Appendix A.

## **SECTION II: FISHERIES**

The following text discusses, by species, the major sport fisheries in the UCUSMA. Discussion of recent performance of the fishery will center on harvest and catch during the 2000 and 2001 seasons, as the major source of data for most sport fisheries in the area is the SWHS (Walker et al. *In prep.*). Survey results for 2002 will not be available until the summer of 2003. However, observations or research data regarding the fisheries in 2002 will also be presented when available. A summary of the historical harvest and catch of fish in the UCUSMA by species is presented in Tables 6 and 7, respectively.

## CHINOOK SALMON SPORT FISHERIES

In the UCUSMA, only the Copper River drainage supports anadromous runs of chinook salmon. No anadromous runs of chinook salmon return to the upper Susitna River drainage. Devil's Canyon is a velocity barrier, which prevents upstream salmon migration in this drainage. Chinook salmon returning to the Copper River drainage begin passage through the Copper River Delta and enter the Copper River during early May. Inriver returns of all salmon are estimated by the sonar unit located at Miles Lake. The peak migration into the river is generally from mid-May to mid-June, with the return essentially complete by July 1. However, small numbers of chinook salmon continue to enter the Copper River through August. Chinook salmon make their way to spawning areas in Copper River tributaries primarily through June and July, with spawning beginning in mid-July and continuing through August.

Chinook salmon are broadly distributed throughout the Copper River basin, having been observed in approximately 40 tributaries. Aerial escapement surveys have been conducted in 35 of these systems, but only nine of these systems have been surveyed consistently since 1966 (Roberson and Whitmore 1991). In general, chinook salmon runs to these nine Copper River tributaries have been above historical averages since 1982 (Table 8). In 1992, 1995 and 2001 escapement surveys in these years were flown outside the peak dates and are considered tenuous at best (Figure 4). During 1995, heavy rains throughout the summer caused high siltation, which obscured visibility in the lower Gulkana River. Aerial surveys of the index streams east of the Gulkana were later than normal and may have missed the bulk of the chinook return. In 2001, poor weather and pilot availability resulted in surveys being conducted outside the historic peak dates, and the Gulkana, East Fork Chistochina, and Indian rivers had high water levels that obscured visibility. Many of the nine streams were not surveyed in 1993, so comparison to historical means during 1992, 1993, 1995, and 2001 is not advisable. During 1996 and 1997, chinook salmon counts of many index streams were at or near record levels. The count for index streams between 1996 and 1998 constituted the three highest index counts since 1977. In 2000, portions of the aerial surveys were conducted after the July 17 – 31 peak survey period due to cloud cover and rainy conditions. Although the total aerial escapement index was less than the escapement objective by approximately 300, returns to the Gulkana River and upper Copper River index streams were near average. The lower Copper River index stream counts were below the objective and account for the mid-portion of the upper Copper River chinook salmon return. Unfortunately, assessment of chinook salmon spawning escapements through aerial survey evaluation of key index areas does *not* provide an estimate of the total spawning return. This is because not all spawning areas are surveyed and not all spawners are counted in surveyed areas.

Copper River chinook salmon stocks are harvested in a variety of fisheries including: (1) a commercial gillnet fishery on the Copper River delta, (2) a subsistence dip net fishery (personal use prior to 2000) in the Copper River near Chitina, (3) a subsistence dip net and fishwheel fishery in the Copper River between the Chitina and Slana rivers confluence, and (4) sport fisheries that occur in various spawning tributaries. The total harvest of chinook salmon in these fisheries has been estimated since 1966 (Sharp et al. 2000, Roberson and Whitmore 1991). Since 1982, the total harvest of chinook salmon in these fisheries has ranged from 27,000 to over 85,000 (Table 9). The total chinook harvest in 2000 and 2001 were below the recent 10 year average and the lowest harvests since 1993. Unfortunately, the contribution to the catch by each spawning stock for these mixed stock fisheries cannot be quantified at present (Brady et al. 1991,

**Table 6.-Number of fish harvested, by species, by recreational anglers fishing UCUSMA waters, averaged for 1977 - 1989 and annually from 1990 - 2001.**

	Chinook	Sockeye	Coho	Steelhead	Rainbow	Dolly	Lake	Arctic			Landlocked	Other
Year	Salmon	Salmon	Salmon	Trout	Trout	Varden	Trout	Grayling	Burbot	Whitefish	Salmon	Fish
1977-89 <sup>a</sup>	2,072	3,157	246	89	5,433	3,583	7,283	27,490	7,818	2,791	1,943	253
1990	2,302	3,569	0	34	3,924	3,159	5,503	13,775	1,836	1,784	17	0
1991	4,884	5,511	69	114	6,868	2,140	4,864	13,278	793	717	111	47
1992	4,412	4,560	113	8	9,373	1,997	4,251	11,125	1,495	1,150	433	11
1993	8,217	5,288	249	0	7,245	3,173	4,569	12,504	1,694	815	56	9
1994	6,431	6,533	209	7	5,808	1,598	4,058	14,066	2,869	1,149	134	128
1995	6,709	6,068	160	10	4,671	1,695	2,934	14,289	995	898	42	30
1996	9,116	11,851	192	0	5,076	2,575	2,632	10,534	981	384	751	0
1997	8,346	12,293	96	0	2,812	1,092	1,923	8,583	1,358	134	331	56
1998	8,245	11,184	289	0	5,182	1,589	1,723	8,275	1,485	584	477	0
1999	6,742	11,101	24	8	3,842	2,390	2,135	8,245	1,861	317	232	0
2000	5,531	12,361	324	0	2,877	991	1,700	6,590	2,290	451	436	22
2001	4,904	8,169	92	0	2,416	1,612	1,185	4,450	1,506	1,135	282	207
<b>1990-1999<sup>a</sup></b>	<b>6,540</b>	<b>7,796</b>	<b>140</b>	<b>18</b>	<b>5,480</b>	<b>2,141</b>	<b>3,459</b>	<b>11,467</b>	<b>1,537</b>	<b>793</b>	<b>258</b>	<b>28</b>
<b>1995-1999<sup>a</sup></b>	<b>7,832</b>	<b>10,499</b>	<b>152</b>	<b>4</b>	<b>4,317</b>	<b>1,868</b>	<b>2,269</b>	<b>9,985</b>	<b>1,336</b>	<b>463</b>	<b>367</b>	<b>17</b>

<sup>a</sup> Average value for the years depicted.

**Table 7.-Number of fish caught, by species, by recreational anglers fishing UCUSMA waters, 1990-2001.**

Year	Chinook Salmon	Sockeye Salmon	Coho Salmon	Steelhead Trout	Rainbow Trout	Dolly Varden	Lake Trout	Arctic Grayling	Burbot	Whitefish	Landlocked Salmon	Other Fish
1990	6,057	8,474	0	136	12,312	5,639	15,335	80,300	2,872	2,276	51	0
1991	10,079	10,243	120	140	14,842	8,620	10,444	55,214	946	1,566	389	47
1992	12,340	9,344	169	39	27,412	6,243	12,886	59,051	2,222	4,074	670	22
1993	21,767	10,813	354	102	23,300	7,903	17,728	80,497	2,471	2,670	145	53
1994	11,272	11,700	417	332	25,187	5,947	13,368	80,302	4,064	3,368	550	660
1995	14,178	10,383	254	51	16,979	3,129	10,937	67,000	2,375	1,826	109	70
1996	27,195	25,265	502	121	19,935	4,595	11,209	77,381	1,639	3,017	1,244	6
1997	27,760	26,724	304	126	20,867	3,439	9,101	69,463	2,646	1,075	1,095	81
1998	22,324	21,359	1,535	196	22,283	4,156	8,184	71,625	2,849	1,612	1,708	80
1999	18,034	20,782	73	264	14,809	6,971	14,184	64,166	3,173	907	309	58
2000	18,503	19,348	596	346	18,330	3,034	9,388	50,467	4,316	2,019	800	58
2001	16,000	15,843	733	234	19,5310	6,145	6,913	46,586	2,527	3,069	513	233
<b>1990-1999<sup>a</sup></b>	<b>17,101</b>	<b>15,509</b>	<b>373</b>	<b>151</b>	<b>19,779</b>	<b>5,664</b>	<b>12,338</b>	<b>70,484</b>	<b>2,515</b>	<b>2,239</b>	<b>627</b>	<b>108</b>
<b>1995-1999<sup>a</sup></b>	<b>21,898</b>	<b>20,903</b>	<b>534</b>	<b>152</b>	<b>18,975</b>	<b>4,458</b>	<b>10,723</b>	<b>69,927</b>	<b>2,536</b>	<b>1,687</b>	<b>893</b>	<b>59</b>

<sup>a</sup> Average value for the years depicted.

**Table 8.-Upper Copper River chinook salmon aerial escapement index counts, 1977-2002.**

Year	Copper River Upstream of Gulkana			Tazlina Drainage		Klutina Drainage		Tonsina Drainage		Total
	Gulkana River	E. Fork Chistochina River	Indian River	Mendeltna Creek	Kiana Creek	St. Anne Creek	Manker Creek	Little Tonsina River	Grayling Creek	
1977	729	132	c	73	91	10	15	c	c	1,050
1978	618 <sup>f</sup>	137	9	52 <sup>e</sup>	125 <sup>e</sup>	24 <sup>e</sup>	20 <sup>e</sup>	285 <sup>e</sup>	92 <sup>e</sup>	1,362
1979	764	810	29	5 <sup>e</sup>	279 <sup>e</sup>	16 <sup>e</sup>	16 <sup>e</sup>	285 <sup>e</sup>	153 <sup>e</sup>	2,357
1980	712	575	24	3 <sup>e</sup>	247	8 <sup>e</sup>	35 <sup>e</sup>	70 <sup>e</sup>	66 <sup>e</sup>	1,740
1981	77	120	c	51	191	19	33	191	107	789
1982	879 <sup>e</sup>	1,260	179	70 <sup>e</sup>	200 <sup>e</sup>	35 <sup>e</sup>	49 <sup>e</sup>	440 <sup>e</sup>	124 <sup>e</sup>	3,236
1983	589	575	41	12 <sup>e</sup>	166	87	141	330	287	2,228
1984	1,331	577	17	26 <sup>e,f</sup>	382 <sup>f</sup>	89 <sup>f</sup>	264 <sup>f</sup>	568	279	3,533
1985	224	360	14	26 <sup>e</sup>	91 <sup>e</sup>	15 <sup>e</sup>	22 <sup>e</sup>	203 <sup>e</sup>	58 <sup>e</sup>	1,013
1986	1,484	618	c	76	328	182	251	424	224	3,587
1987	1,098	764	33	10	80	192	141	247	112	2,677
1988	831	709	c	25 <sup>e</sup>	249	64	119	78	167	2,242
1989	2,009	750	7	187	345	90	165	68 <sup>e</sup>	78	3,699
1990	1,171 <sup>e</sup>	645	15	323 <sup>e</sup>	414 <sup>e</sup>	43 <sup>e</sup>	43	57	52 <sup>e</sup>	2,763
1991	1,223 <sup>e</sup>	925	18	310 <sup>f</sup>	522 <sup>f</sup>	130	107	59	159	3,453
1992	540	88	1	83 <sup>e</sup>	79 <sup>e</sup>	12 <sup>e</sup>	14 <sup>e</sup>	107	17 <sup>e</sup>	941
1993	693	c		c	c	c	c	c	c	693
1994	786	508	47	120	430	250	75	4 <sup>e</sup>	2 <sup>e</sup>	2,222
1995	285 <sup>f</sup>	37 <sup>e</sup>	2 <sup>e</sup>	32 <sup>e</sup>	111 <sup>e</sup>	26 <sup>e</sup>	8 <sup>e</sup>	25 <sup>e</sup>	26 <sup>e</sup>	552
1996 <sup>f</sup>	1,364 <sup>f</sup>	450 <sup>f</sup>	11 <sup>f</sup>	360 <sup>f</sup>	723 <sup>f</sup>	117 <sup>f</sup>	164 <sup>f</sup>	25 <sup>f</sup>	143 <sup>f</sup>	3,357
1997	2,270	2,245 <sup>f</sup>	270 <sup>f</sup>	311 <sup>f</sup>	693 <sup>f</sup>	900 <sup>f</sup>	466 <sup>f</sup>	55 <sup>f</sup>	330 <sup>f</sup>	7,540
1998	1,407	740 <sup>f</sup>	48	280 <sup>f</sup>	700 <sup>f</sup>	515 <sup>f</sup>	843 <sup>f</sup>	60	527 <sup>f</sup>	5,120
1999	934 <sup>e</sup>	82 <sup>e</sup>	2 <sup>e</sup>	38 <sup>e</sup>	216 <sup>e</sup>	486 <sup>e</sup>	69 <sup>e</sup>	93 <sup>e</sup>	88 <sup>e</sup>	2,008

-continued-

**Table 8.-Page 2 of 2.**

Year	Copper River Upstream of Gulkana			Tazlina Drainage		Klutina Drainage		Tonsina Drainage		Total
	Gulkana River	E. Fork Chistochina River	Indian River	Mendeltna Creek	Kiana Creek	St. Anne Creek	Manker Creek	Little Tonsina River	Grayling Creek	
2000	1,174	580	62	125	155 <sup>e</sup>	70	54 <sup>e</sup>	26 <sup>e</sup>	104 <sup>e</sup>	2,350
2001	556 <sup>c</sup>	0 <sup>d</sup>	0 <sup>d</sup>	80 <sup>e</sup>	154 <sup>e</sup>	75 <sup>e</sup>	24 <sup>e</sup>	7 <sup>e</sup>	73 <sup>e</sup>	969
2002	2,087	956	27	220	240	130	130	139	164	4,093
<b>1977-1986<sup>g</sup></b>	<b>725</b>	<b>516</b>	<b>45</b>	<b>67</b>	<b>234</b>	<b>77</b>	<b>141</b>	<b>378</b>	<b>224</b>	<b>2,407</b>
<b>1987-1996<sup>g</sup></b>	<b>951</b>	<b>605</b>	<b>20</b>	<b>197</b>	<b>392</b>	<b>141</b>	<b>116</b>	<b>96</b>	<b>132</b>	<b>2,650</b>
<b>1997-2001<sup>g</sup></b>	<b>1,617</b>	<b>1,188</b>	<b>127</b>	<b>239</b>	<b>697</b>	<b>495</b>	<b>655</b>	<b>58</b>	<b>429</b>	<b>5,505</b>
<b>Escapement Objective</b>	<b>1,200</b>	<b>500</b>	-	350		250		350		<b>2,650</b>

<sup>a</sup> Some data published in Brady et al. 1991, remainder is unpublished. Escapement objectives are for the drainage.

<sup>b</sup> Gulkana River index counts are those upstream and including the West Fork.

<sup>c</sup> No aerial survey conducted.

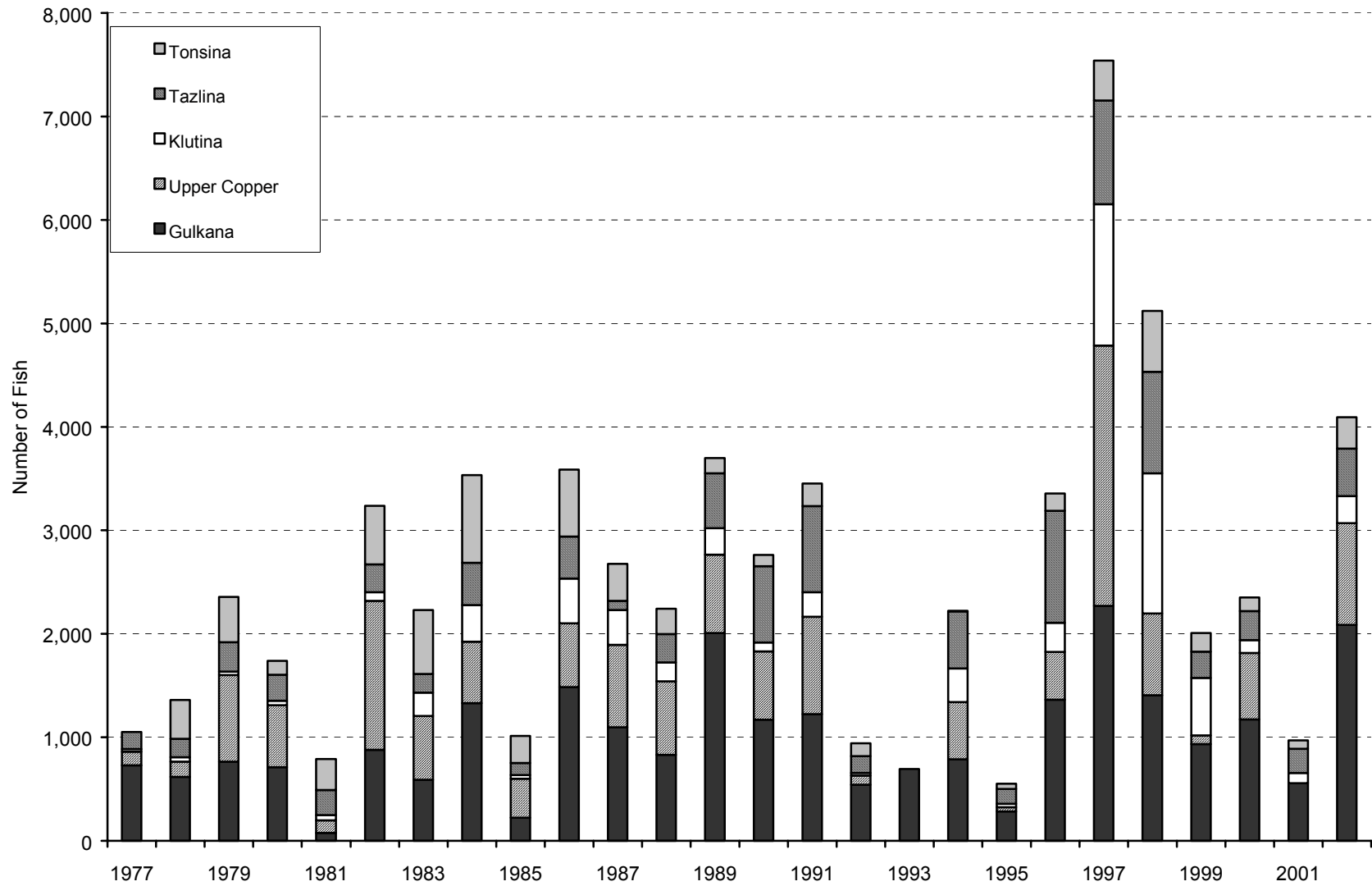
<sup>d</sup> Visibility poor due to high water.

<sup>e</sup> Survey flown outside of July 17 - 31.

<sup>f</sup> Counts determined by two surveyors. In years where more than one surveyor was used, counts from the most experienced surveyor are listed.

<sup>g</sup> Averages exclude years when surveys were flown outside July 17-31.





**Figure 4.-Upper Copper River chinook salmon aerial survey index escapement counts by drainage, 1977-2002.**

**Table 9.-Copper River chinook salmon harvests and escapement indices, 1977-2002.**

Year	Commercial Harvest <sup>a</sup>	Sport Harvest	Subsistence Harvest <sup>b</sup>	Personal Use Harvest <sup>b</sup>	Total Harvest	Aerial Escapement Index
1977	21,722	532	2,555	<sup>c</sup>	24,809	1,050
1978	29,062	641	2,239	<sup>c</sup>	31,942	1,362
1979	17,678	2,948	3,416	<sup>c</sup>	24,042	2,357
1980	8,454	2,101	3,035	<sup>c</sup>	13,590	1,740
1981	20,178	1,717	2,410	<sup>c</sup>	24,305	789
1982	47,362	1,802	2,764	<sup>c</sup>	51,928	3,236
1983	52,500	2,579	5,950	<sup>c</sup>	61,029	2,228
1984	38,957	2,787	509	1,760	44,013	3,533
1985	42,214	1,939	629	1,329	46,111	1,013
1986	40,670	3,663	686	2,367	47,386	3,587
1987	41,001	2,301	813	2,968	47,083	2,677
1988	30,741	1,562	992	2,994	36,289	2,242
1989	30,863	2,356	787	2,251	36,257	3,699
1990	21,702	2,302	647	2,708	27,359	2,763
1991	34,787	4,884	1,328	4,056	45,017	3,453
1992	39,810	4,412	1,449	3,405	49,068	941
1993	29,727	8,217	1,434	2,846	42,224	693
1994	47,061	6,431	1,989	3,743	59,224	2,222
1995	65,675	6,709	1,892	4,707	78,983	552
1996	55,646	9,116	1,482	3,584	69,828	3,357
1997	51,273	8,346	2,583	5,447	67,649	7,540
1998	68,827	8,245	1,842	6,723	85,637	5,120
1999	62,337	6,742	3,049	5,913	78,247	2,008
2000	31,259	5,531	4,856	3,168	44,816	2,350
2001	39,524	4,904	3,553	3,113	51,509	969
2002	38,734	6,500 <sup>d</sup>	4,000 <sup>d</sup>	2,500 <sup>d</sup>	51,734	4,093
<b>1977-1989<sup>f</sup></b>	<b>32,416</b>	<b>2,071</b>	<b>2,060</b>	<b>2,278</b>	<b>37,599</b>	<b>2,736</b>
<b>1990-1999<sup>f</sup></b>	<b>47,685</b>	<b>6,540</b>	<b>1,770</b>	<b>4,313</b>	<b>60,324</b>	<b>3,353</b>
<b>1995-1999<sup>f</sup></b>	<b>60,752</b>	<b>7,832</b>	<b>2,170</b>	<b>5,275</b>	<b>76,069</b>	<b>4,307</b>

<sup>a</sup> Morstad et al. 1999.<sup>b</sup> These figures are expanded to reflect unreported permits. See Table 2 for reported harvests.<sup>c</sup> The Copper River Chitina Subdistrict was a Personal Use Fishery from 1984 - 1999 and was reclassified a subsistence fishery in 1999.<sup>d</sup> Estimated.<sup>e</sup> Preliminary.<sup>f</sup> Average value for the years depicted.

Roberson and Whitmore 1991). Thus, it is not currently possible to assess productivity using stock specific spawner-recruit relationships.

The Copper River District commercial fishery management strategy provides for two, 24-hour periods per week commencing during the second or third week of May, with adjustments in the fishing schedule being made through emergency order. Early season management, when chinook salmon are of consequence in the fishery, is based on actual catches compared to anticipated catches. Under the *Copper River Chinook Salmon Fishery Management Plan*, by emergency order, the department has the authority to open and close the season within the inside statistical areas of the Copper River District, during the first two weeks of the fishing season. Following the 1999 BOF meeting, the modifications to the *Copper River Chinook Salmon Fishery Management Plan* provided the Department additional means to conserve chinook salmon for spawning escapement. From 1995-1999, chinook salmon harvest in the Copper River District Delta commercial fishery has averaged over 60,000 fish (Table 9; Figure 5), with a record harvest occurring in 1998. Prior to 1994, chinook salmon harvest had remained relatively stable. Since 2000, harvests have declined; primarily through management plan actions (inside statistical area closures) and fishery closures occurring to manage for sockeye salmon escapement.

Subsistence and personal use (combined) harvests of Copper River chinook salmon have averaged nearly 7,500 fish from 1995-1999, with harvests numbers trending upwards during this period (Table 9). The Glennallen Subdistrict subsistence fishery occurs from June 1 through September 30 in the mainstem Copper River from the upstream edge of the Chitina-McCarthy Highway bridge upstream to Slana. Fishwheels and dip nets are legal gear and permits are required. The maximum harvest limit for a household of one person is 200 fish and for a household of two or more is 500 fish. There is no limit as to the number of chinook salmon within the annual permit limit for people using fishwheels, while a five chinook salmon limit is imposed on subsistence fishermen using dip nets. Chinook salmon are present in the fishery on June 1 and, on average, 80% of the chinook salmon harvest is taken by July 12 (Roberson and Whitmore 1991).

The Chitina Subdistrict subsistence fishery is restricted to mainstem waters of the Copper River from the downstream edge of the Chitina-McCarthy Highway bridge, downstream to a department marker located approximately 200 yards upstream of Haley Creek. The season is from June 1 through September 30. Fishing periods are established by emergency order. A schedule of fishery openings is published prior to the season. The schedule is designed to allow a total harvest of 100,000-150,000 sockeye salmon, based on the weekly forecasted return. Adjustments to the schedule are made inseason based on actual sonar counts compared to projected counts; fishing times are increased or decreased if actual counts are greater or less than projected counts. Participants in both subsistence fisheries must be residents of Alaska. Permits are a requirement of this fishery, daily harvest by species must be recorded and permits for both fisheries must be returned to the Department at the end of the fishing season.

In the Chitina Subdistrict subsistence fishery, permits limit households of one individual to 15 salmon of which no more than one can be chinook salmon and households of more than one person to 30 salmon of which no more than one can be chinook salmon. Chinook salmon are present in the subdistrict when the fishery is opened. On average, 80% of the chinook salmon harvest is taken by July 1 and 95% by July 17 (Roberson and Whitmore 1991).

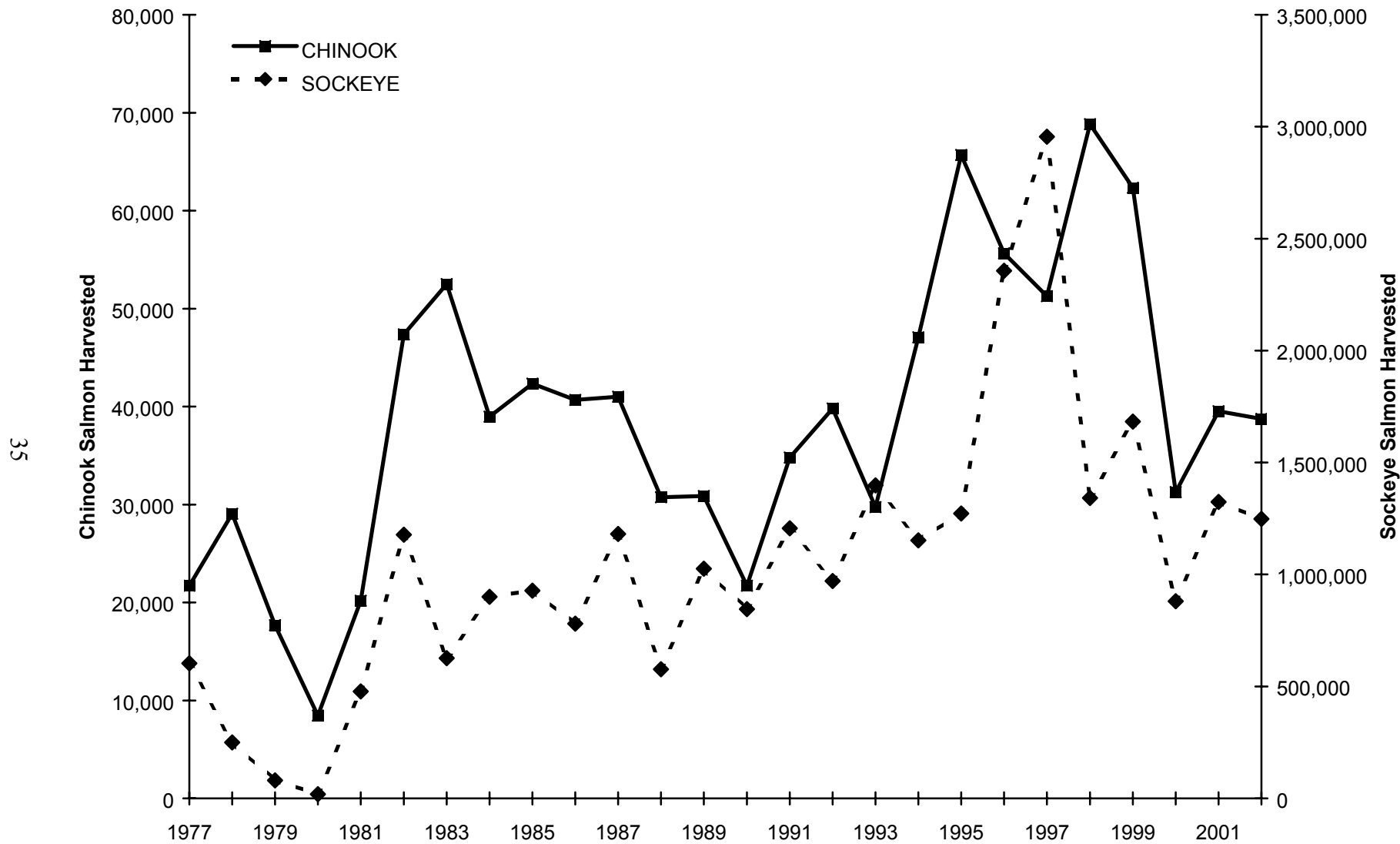


Figure 5.-Copper River District commercial harvest of chinook and sockeye salmon, 1977-2001.

The average sport harvest of chinook salmon from Copper River tributaries more than tripled between 1977 - 1989 and 1990 - 1999, with the 1996 harvest of 9,116 being the highest on record (Table 10, Figure 6). Since 1990, the average harvest of chinook salmon by sport anglers fishing UCUSMA waters has been about 6,000 fish. Sport harvests of chinook salmon in the UCUSMA during 2000 and 2001 accounted for approximately 3% of the statewide, and 70% of the AYK regions chinook sport harvests (Table 10). The fishery occurs in various tributaries to the Copper River with the largest fisheries occurring in the Gulkana and Klutina rivers (Table 11). Approximately 95% of the estimated sport harvest of chinook salmon taken from the Copper River drainage during 1990-1999 was taken from these two drainages. From 1990-1999, catch has averaged nearly 17,000 chinook salmon by sport anglers fishing the UCUSMA waters (Table 12). Approximately, 38% of the catch has been harvested over this same period. The Klutina River has a slightly higher retention rate (43%) of chinook salmon than the Gulkana River (36%) during this time period.

Since 1970, the sport harvest of chinook salmon over 20 inches within the Copper River Basin sport fishery has been limited by a bag and possession limit of one per day and one in possession. Further protection was afforded area chinook salmon stocks through spawning season closures beginning in 1989. Beginning in 1989, to reduce catch-and-release mortality, any chinook salmon removed from UCUSMA waters becomes part of the daily bag and possession limit of the person who hooked the fish. During 1991, sport chinook salmon fishing was closed in Fish, Indian, Bernard, Ahtel and Natat creeks and the Little Tonsina River. This action was taken in an effort to bolster escapements to these small clear water tributaries, which have showed decline in chinook salmon returns in recent years. Also during 1991, the portion of the Gulkana River 7.5 miles upstream of the confluence of the West Fork was designated as an area where only unbaited, single-hook artificial lures may be used. This action was taken as a conservation measure for rainbow trout and has had little or no effect on the chinook salmon fishery. In 1994, a seasonal bag limit of five chinook was instituted for the Copper River drainage. In 1997, following the 1996 BOF meeting, sport chinook salmon fishing was closed in Manker Creek, Klutina Lake and all flowing waters entering Klutina Lake, all tributaries to the Tonsina River, Tonsina Lake and all flowing waters entering Tonsina Lake, the Chokosna and Gilahina rivers and all clearwater tributaries of the Gakona River, Tazlina Lake and all flowing waters entering Tazlina Lake except ¼ mile radius around the mouth of Kiana Creek. In addition, the season closure date for chinook salmon was moved from August 10 to August 1 for the flowing waters downstream of the department markers located at mile 19.2 on the Klutina Lake Road. These measures were taken to protect spawning chinook salmon. To reduce harvests in the Tonsina River the use of bait was restricted and only unbaited, single hook, artificial lures were permitted. In addition, creation of the *Copper River Chinook Salmon Fishery Management Plan* (AAC 2002c) during the BOF meeting, resulted in a 5% reduction in the harvest potential of the commercial, personal use, and sport fisheries to provide for escapement levels at or above historic levels. This was to be achieved in the sport fishery through the prohibition of guiding in the flowing waters of the Copper River drainage on Tuesdays from May 15 to July 31. At the 1999 BOF meeting, this provision was deemed ineffective and as a result the chinook salmon seasonal bag limit was reduced from 5 to 4 in the Copper River drainage. This reduction was implemented to achieve the 5% reduction the guide restriction was unable to accomplish. At this meeting, the reference to the personal use fishery was removed from the plan with the establishment of the Chitina Subdistrict subsistence fishery.

**Table 10.-Harvest of chinook salmon by recreational anglers fishing UCUSMA waters, 1977-2001.**

Year	Copper River Drainage Harvest	Alaska Harvest	Percent	Region III Harvest	Percent
1977-1989 <sup>a</sup>	2,072	68,182	3.0	4,058	51
1990	2,302	101,057	2.3	4,107	56
1991	4,884	123,493	4.0	6,847	71
1992	4,412	127,854	3.5	6,092	72
1993	8,217	180,915	4.5	12,171	67
1994	6,431	176,387	3.7	11,460	56
1995	6,709	150,205	4.5	11,000	61
1996	9,116	161,572	5.6	16,193	56
1997	8,346	182,433	4.6	14,971	56
1998	8,245	141,488	5.8	12,890	64
1999	6,742	180,882	3.7	9,855	68
2000	5,531	173,653	3.2	7,666	72
2001	4,904	171,994	2.9	7,301	67
<b>1990-1999<sup>a</sup></b>	<b>6,540</b>	<b>152,629</b>	<b>4</b>	<b>10,559</b>	<b>63</b>
<b>1995-1999<sup>a</sup></b>	<b>7,832</b>	<b>163,316</b>	<b>5</b>	<b>12,982</b>	<b>61</b>

<sup>a</sup> Average value for the years depicted.

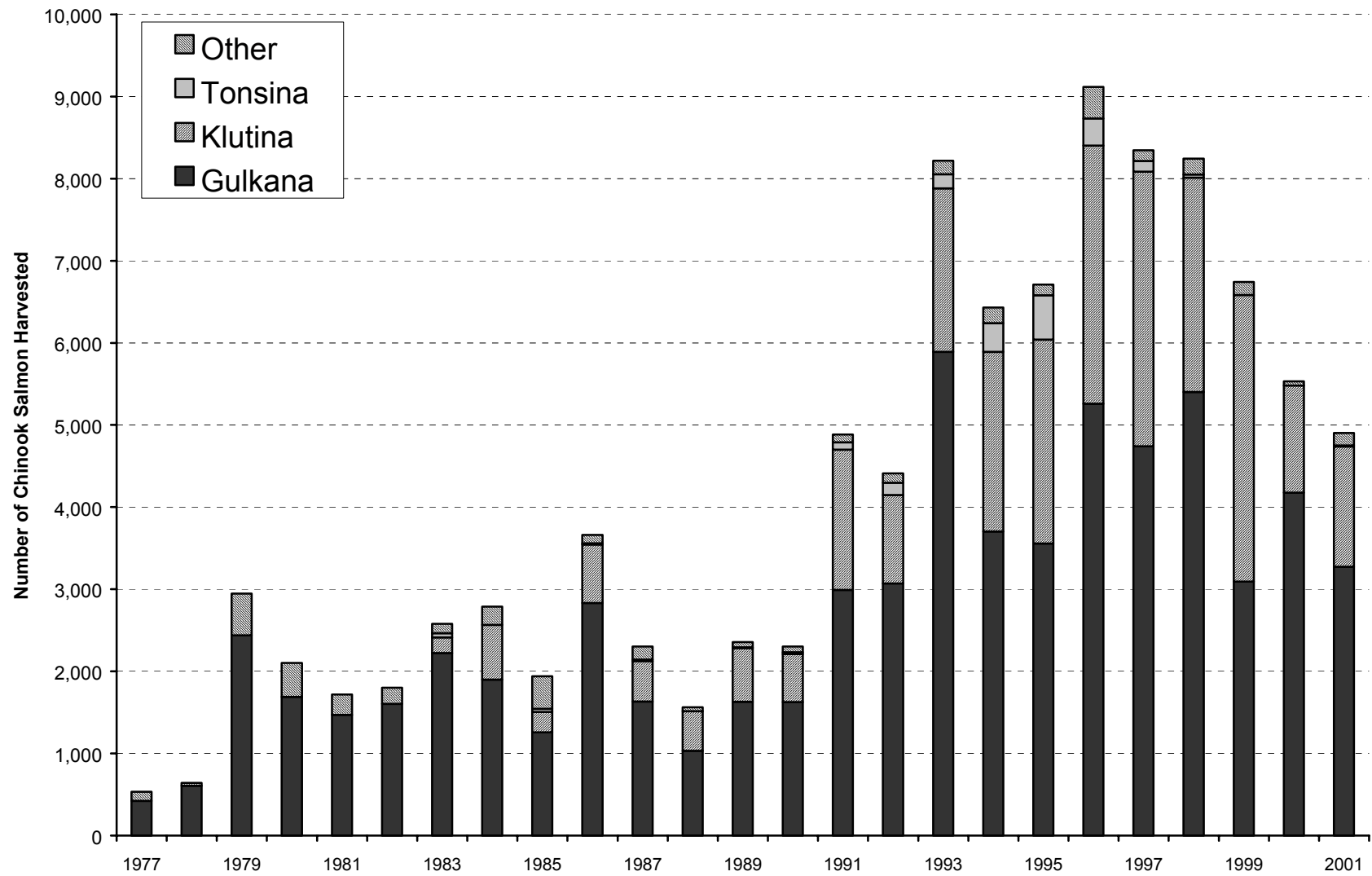


Figure 6.-Upper Copper River chinook salmon sport harvest by drainage, 1977-2001.

**Table 11.-Harvest of chinook salmon by recreational anglers fishing in the UCUSMA by drainage, averaged for 1977 – 1989 and annually from 1990 to 2001.**

Areas	1977-89	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>d</sup>	1995-1999 <sup>d</sup>
<b>Gulkana River Drainage</b>															
Upper River	422 <sup>b</sup>	239	483	416	694	1,352	984	1,165	1,872	885	845	1,318	967	894	1,150
Lower River	299 <sup>b</sup>	525	1,321	1,395	1,894	2,071	2,250	3,362	2,514	3,786	1,764	2,304	1,793	2,088	2,735
Gulkana River Other <sup>a</sup>	1,206	863	1,187	1,260	3,304	279	322	733	355	732	484	555	514	952	525
<b>Total</b>	<b>1,927</b>	<b>1,627</b>	<b>2,991</b>	<b>3,071</b>	<b>5,892</b>	<b>3,702</b>	<b>3,556</b>	<b>5,260</b>	<b>4,741</b>	<b>5,403</b>	<b>3,093</b>	<b>4,177</b>	<b>3,274</b>	<b>3,934</b>	<b>4,411</b>
<b>Klutina River Drainage</b>															
	486 <sup>b</sup>	583	1,709	1,075	1,989	2,189	2,485	3,142	3,344	2,608	3,489	1,303	1,465	2,261	3,014
<b>Tonsina River Drainage</b>															
	19	23	89	152	172	349	539	331	131	39	0	0	11	183	208
<b>Tazlina Drainage</b>															
	30 <sup>b</sup>	17	32	8	0	105	0	64	28	63	0	0	0	32	31
<b>Copper River</b>															
Upstream of Gulkana	10 <sup>b</sup>	17	0	18	47	16	0	0	0	0	25	0	0	12	5
Downstream of Klutina <sup>c</sup>	34 <sup>b</sup>	0	25	55	64	20	0	64	22	15	11	10	32	28	22
<b>Other Waters</b>															
	161	35	38	33	53	50	129	255	80	117	124	41	122	91	141
<b>Area Total</b>	<b>2,072<sup>d</sup></b>	<b>2,302</b>	<b>4,884</b>	<b>4,412</b>	<b>8,217</b>	<b>6,431</b>	<b>6,709</b>	<b>9,116</b>	<b>8,346</b>	<b>8,245</b>	<b>6,742</b>	<b>5,531</b>	<b>4,904</b>	<b>6,540</b>	<b>7,832</b>

<sup>a</sup> Includes harvests not specified as taken in lower or upper river.

<sup>b</sup> Includes 1983-1988 average only. Prior to 1983, this harvest was included in “other waters” in the SWHS report.

<sup>c</sup> Does not include Tonsina River drainage.

<sup>d</sup> Average of total annual harvest for the years depicted.



**Table 12.-Catch of chinook salmon by recreational anglers fishing in the UCUSMA by drainage, annually from 1990-2001.**

Areas	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>b</sup>	1995-1999 <sup>b</sup>
<b>Gulkana River Drainage</b>														
Upper River	2,728	3,956	4,635	10,592	3,038	2,963	3,472	9,658	2,335	3,221	4,890	2,947	<b>4,660</b>	<b>4,330</b>
Lower River	1,055	2,731	3,419	4,994	3,407	4,839	11,836	7,385	11,115	4,876	7,650	6,417	<b>5,566</b>	<b>8,010</b>
Gulkana River other					83	46	2,507	1,080	2,003	937	1,379	1,470	<b>1,109</b>	<b>1,315</b>
<b>Total</b>	<b>3,783</b>	<b>6,687</b>	<b>8,054</b>	<b>15,586</b>	<b>6,528</b>	<b>7,848</b>	<b>17,815</b>	<b>18,123</b>	<b>15,453</b>	<b>9,034</b>	<b>13,919</b>	<b>10,834</b>	<b>10,891</b>	<b>13,655</b>
<b>Klutina River Drainage</b>														
	1,493	3,036	3,822	4,934	3,807	5,081	7,407	8,677	5,815	8,637	4,057	4,922	<b>5,271</b>	<b>7,123</b>
<b>Tonsina River Drainage</b>														
	35	146	222	614	698	1,102	832	395	193	0	292	21	<b>424</b>	<b>504</b>
<b>Tazlina Drainage</b>														
	146	134	8	0	144	0	74	94	101	104	0	0	<b>81</b>	<b>75</b>
<b>Copper River</b>														
Upstream of Gulkana	17	0	18	283	16	0	0	0	419	50	178	53	<b>80</b>	<b>94</b>
Downstream of Klutina <sup>a</sup>	0	25	160	176	29	9	246	22	60	22	16	32	<b>75</b>	<b>72</b>
<b>Other Waters</b>														
	583	51	56	174	50	138	821	449	283	187	41	138	<b>279</b>	<b>376</b>
<b>Area Total</b>	<b>6,057</b>	<b>10,079</b>	<b>12,340</b>	<b>21,767</b>	<b>11,272</b>	<b>14,178</b>	<b>27,195</b>	<b>27,760</b>	<b>22,324</b>	<b>18,034</b>	<b>18,503</b>	<b>16,000</b>	<b>17,101</b>	<b>21,898</b>

<sup>a</sup> Does not include Tonsina River drainage.<sup>b</sup> Average of total annual catch for the years depicted.

Under the *Copper River District Salmon Management Plan* (AAC 2002b), the department is directed to manage the commercial fishery to achieve an inriver goal of 15,000 salmon, annually, for the sport fishery in the Copper River tributaries. This sport harvest allocation has been exceeded since 1996, primarily due to the doubling of the sockeye sport harvest during those four years due to strong sockeye runs and an increased development in the sockeye fishery. Given the increase in the popularity of the sport chinook and sockeye salmon fishery in the Copper River basin, it is likely that the allocation will continue to be exceeded into the future unless actions are taken to reduce harvest or the inriver escapement goal is raised to accommodate the growth in the fishery. Under the revised *Copper River Chinook Salmon Fishery Management Plan* the department is directed to manage the commercial and sport fisheries to achieve a spawning escapement range of 28,000 – 55,000 chinook salmon. Through management actions resulting from this plan, chinook salmon harvest declined in 2000 and 2001.

Conflicts among users and concerns over chinook salmon resources have been a contentious issue in previous Board of Fisheries meetings, and will likely continue to be in future meetings. The department is moving forward in improving escapement estimates in index spawning streams through conducting surveys during peak counting periods, as well as estimating contribution of spawning streams to total chinook escapement through radio-telemetry studies. In the past, Copper River chinook salmon stocks have been considered healthy (Roberson and Whitmore 1991). Increasing harvests over the past decade have been supported by above average returns (Table 9). Strong returns of chinook salmon are unlikely to continue indefinitely, while participation in upriver fisheries is likely to increase. To more accurately assess chinook salmon abundance, research was initiated during 1995 to estimate the timing and contribution of chinook salmon stocks from major tributaries to the Copper River. Following initial feasibility studies in 1995 and 1996, capture and coded wire tagging of juvenile chinook salmon began in 1997 in the Gulkana, Klutina, and Tonsina rivers; continued in 1998 with tagging on the Gulkana, Tonsina and Chistochina rivers; and finished in 1999 with tagging on the Gulkana, Klutina and Chistochina rivers (Sarafin 2000). Recovery of tagged chinook salmon occurred in the commercial fishery in 2001 and 2002, though tag recovery has been insufficient and this project will be discontinued following 2002. A weir was operated successfully in the Gulkana River from June 11 to July 31 in 1996, a total of 11,684 chinook and 183,461 sockeye were enumerated (LaFlamme 1997). Since 1999, a radio-telemetry study has been conducted on the Copper River that deployed radio-transmitters in chinook salmon captured downstream of Haley Creek (Evenson and Wuttig 2000, Wuttig and Evenson 2001, Savereide and Evenson *In prep*). The radio-tagged chinook salmon were tracked via remote tracking stations located at the lower and upper ends of the personal use fishery, the mouths of the Chitina, Tonsina, Klutina, Tazlina, and Gulkana rivers, and upstream of the Gulkana River on the mainstem Copper River. These stations recorded the signal of tagged chinook salmon that passed stations equipped with two antennas, to determine if the salmon were moving into the tributary or continuing up the Copper River. From this data, distribution of chinook salmon in the spawning tributaries of the Copper River was determined, as well as timing of entry into the spawning streams and through the personal use fishery. A mark-recapture experiment was conducted through marking all chinook captured during the radio-transmitter deployment and recapture of the marked fish in the Chitina Subdistrict subsistence fishery. Total spawning escapement for the upper Copper River in 2000 and 2001 was estimated at 24,490 and 28,247 chinook salmon, respectively (Savereide and Evenson, *In prep*). In addition, the department in concert with BLM initiated a counting tower on Gulkana River in 2002, the goal of this project is to develop a BEG for chinook salmon

in the Gulkana River. The total estimated return to the Gulkana River was 8,462 chinook salmon (Sarafin, *In prep*).

## **Gulkana River Chinook Salmon Sport Fishery**

### **Background and Historic Perspective**

The Gulkana River drainage has historically supported the largest sport fishery for chinook salmon in the UCUSMA. This drainage originates in the Alaska Range and flows south to join the Copper River near the community of Gulkana (Figure 7). The section of the Gulkana River upstream from Sourdough has been designated by the U.S. Congress as “wild” under the Wild and Scenic Rivers Act of 1968. Access to the river is available from various secondary roads and trails off the Richardson Highway, which parallel much of the river. Anglers use rafts, canoes, and powerboats to gain access to the more remote sections of the river. Raft and canoe anglers frequent the various sections of the river from Paxson Lake downstream to the Richardson Highway bridge. Powerboat operators generally launch at Sourdough and use the river from approximately 2 miles below Sourdough upstream to the confluence of the West Fork. More recently powerboat operators have begun launching from the Richardson Highway bridge and fishing the 5-mile reach of the river above the bridge. Powerboat operators access the mouth of the Gulkana River using powerboats launched from Gakona and the Richardson Highway bridge.

Chinook salmon typically begin entering the Gulkana River in early to mid-June. The sport fishery typically peaks during late June, but fishing for chinook salmon continues until the season closes in mid July. Spawning begins in mid-July and continues through late August. Most spawning occurs upstream of the confluence of the West Fork. Under current regulations, anglers fishing the Gulkana River are allowed one chinook salmon over 20 inches daily and in possession and a Upper Copper River drainage-wide total of four per year. All waters above the Middle Fork confluence with the mainstem Gulkana River are closed to fishing for chinook salmon year-round to protect spawning fish. The rest of the river is open to chinook salmon fishing from January 1 through July 19. The closure date is intended to offer protection to spawning fish. The Gulkana River from the Richardson Highway bridge downstream to a department marker 500 yards downstream of its confluence with the Copper River is an area where only single-hook, artificial flies may be used from June 1 through July 31. In all waters of the Gulkana River drainage upstream of a marker 7.5 miles upstream of the West Fork confluence with the mainstem only unbaited, single hook, artificial lures may be used. This regulation is intended to protect rainbow trout stocks that inhabit this area.

The primary source of information regarding the sport fishery is the statewide mail survey (Mills 1979-1994, Howe et al. 1995-2000, Walker et al., *In prep*). Based on this survey, the sport harvest of chinook salmon in the Gulkana River averaged 3,934 fish annually from 1990-1999, and 4,411 fish annually from 1995-1999 (Table 13). The 2000 harvest of 4,177 chinook salmon was above the recent 10 year average and accounted for 76% of the sport harvest of chinook salmon in the UCUSMA. The 2001 harvest of 3,274 chinook salmon was the second lowest harvest since 1992, but still accounted for 67% of the sport harvest in the UCUSMA. Sport fishing effort on the Gulkana River averaged 33,667 angler-days annually from 1990-1999, and 34,943 angler-days from 1995-1999 (Table 5). Due to the nature of the mail survey, effort is not assigned to individual species, but observations suggest that the majority of effort is directed toward chinook salmon. Sport fishing effort in 2000 and 2001 were the lowest since 1989. Lower participation during 2000-2001 was also reflected at the regional level (Table 4). The

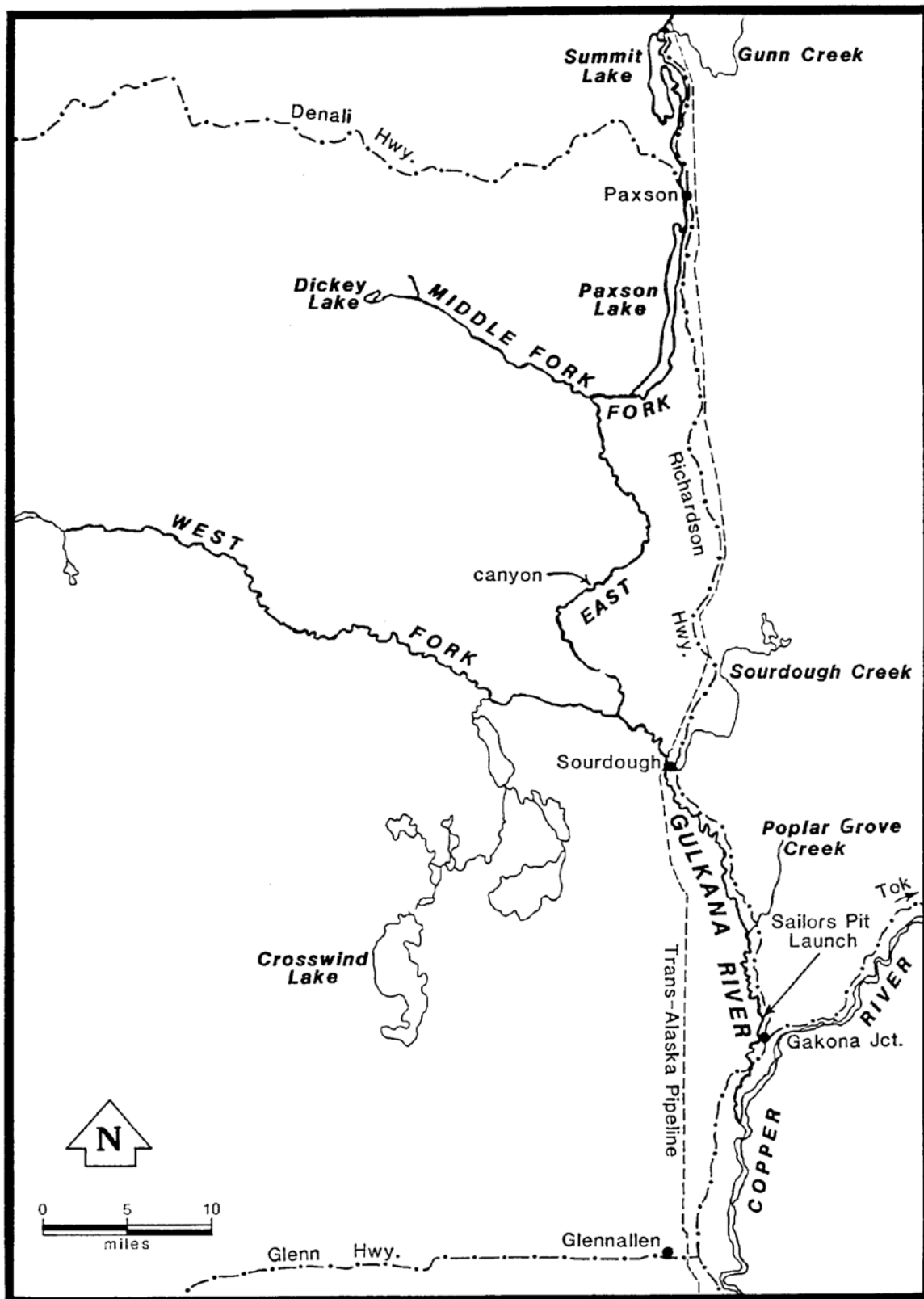


Figure 7.-Map depicting the Gulkana River drainage.

**Table 13.-Sport harvest and spawning escapement indices of chinook salmon in the Gulkana River drainage, averaged for 1977 – 1989 and annually from 1990-2001.**

Year	Sport Harvest	Observed Spawning Escapement <sup>a</sup>
1977-1989 <sup>b</sup>	1,927	873
1990	1,627	1,171
1991	2,991	1,223
1992	3,071	540
1993	5,892	693
1994	3,702	786
1995	3,556	472
1996	5,260	1,364
1997	4,741	2,270
1998	5,403	1,407
1999	3,093	934
2000	4,177	1,174
2001	3,274	556
<b>1990-1999<sup>b</sup></b>	<b>3,934</b>	<b>1,086</b>
<b>1995-1999<sup>b</sup></b>	<b>4,411</b>	<b>1,289</b>

<sup>a</sup> Gulkana River index counts are those upstream and including the West Fork.

<sup>b</sup> Average value for the years during the period

majority of effort and harvest of chinook salmon occurs from the Richardson Highway bridge upstream to the confluence of the West Fork.

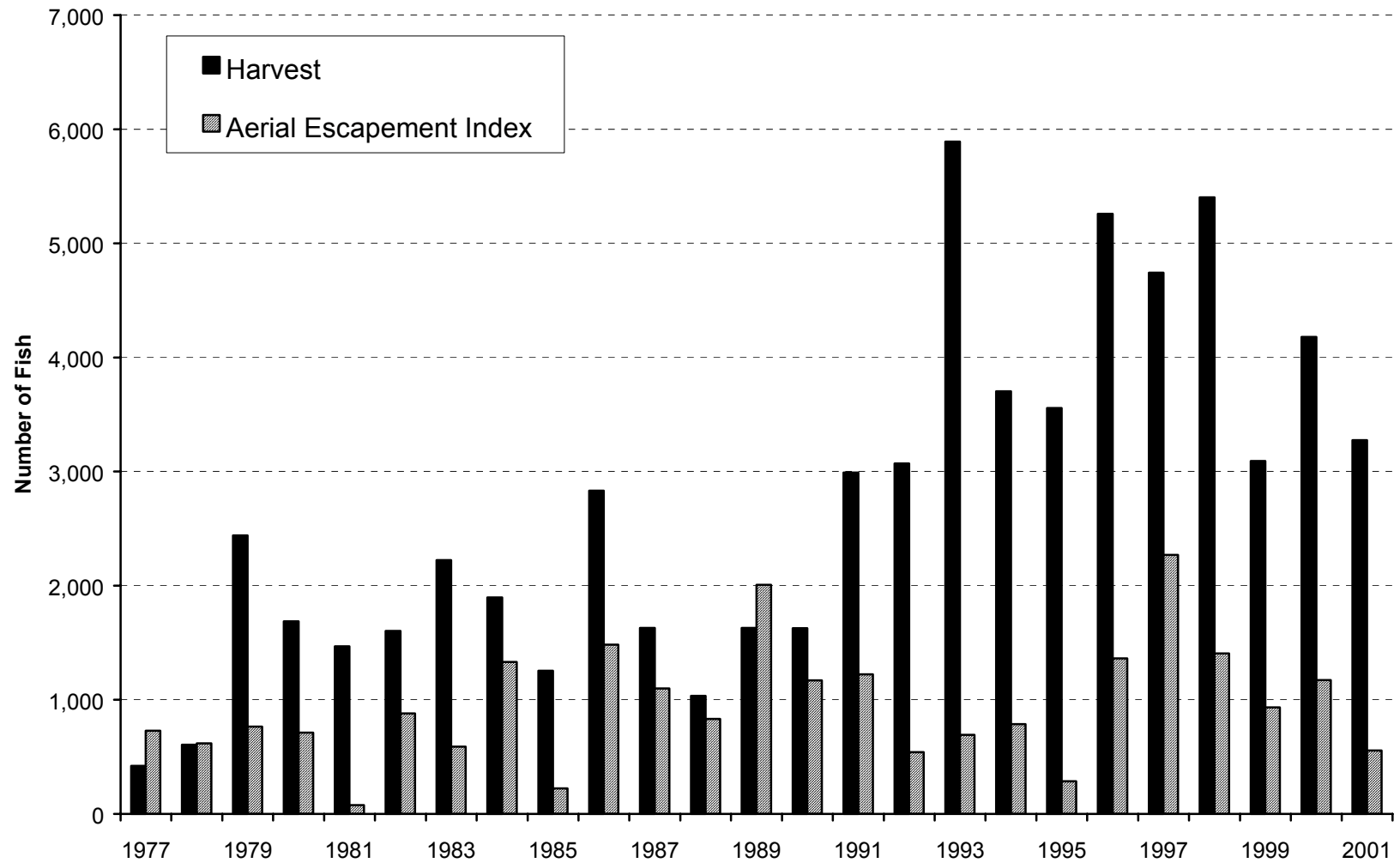
A roving creel survey was conducted in 1989 to estimate the catch and harvest of and effort directed toward chinook salmon. Results of this survey (Potterville and Webster 1990) indicated that sport anglers expended 29,103 angler-hours to catch 2,398 chinook salmon. Sixty-one percent (1,461 fish) of the catch was estimated to be harvested. This estimate of harvest is close to that estimated from the mail survey (1,630 fish), indicating that the mail survey appears to accurately estimate the harvest of chinook salmon in this fishery. Approximately 50% of the harvest was estimated to have occurred on weekends. The majority of the sport harvest occurred in the 5-mile reach directly upstream of the Richardson Highway bridge and the 10-mile reach near the Bureau of Land Management campground and boat launch at Sourdough. Few anglers fished the single-hook, artificial fly-fishing-only area and, although many anglers floated the upper river, the harvest of chinook salmon was minimal in this reach due to the July 19 spawning season closure.

A second access-point creel survey was conducted in 1996. Results of this survey (LaFlamme 1997) indicated that 35,080 angler-hours were expended to catch 4,920 chinook salmon, 50% (2,441 chinook) of the catch was harvested. The estimated catch and harvest reported in the 1996 mail survey was 17,815 and 5,260, respectively. The large discrepancy in estimates between creel and mail survey, 44% and 72% less for harvest and catch, was attributed to access sites used by anglers that were not surveyed in the onsite creel survey, resulting in biased harvest and catch estimates. As in 1989, the majority of harvest occurred at the Richardson Highway bridge and Sourdough access points. Anglers that were guided or used bait had higher catch and harvest rates. Shore anglers caught as many chinook salmon as boat anglers, but harvested more and expended greater effort to catch a chinook salmon.

The spawning escapement of chinook salmon in the Gulkana River upstream of the West Fork has been documented since 1966 by aerial surveys of index sites in the drainage (Brady et al. 1991, Roberson and Whitmore 1991). From 1977 to 1999, escapement counts have generally increased (Table 13). Average escapement from 1977 to 1989 was 873; while from 1990 - 1999 escapement averaged 1,086. The average escapement for 1995 - 1999 is 1,289. High and low escapements during this 25-year period range from 2,270 fish in 1997 to 77 fish in 1981 (Table 8). With the exceptions of a low escapement during 1981, 1985 and 1992, escapements have remained relatively stable since 1977 (Figure 8).

As part of a drainage-wide chinook salmon research project, a weir was operated on the Gulkana River in 1996 to provide a count of chinook escapement. The access-point creel survey was conducted concurrently to estimate the harvest of chinook salmon. Based on the final weir counts and creel survey harvest estimates, the estimated total inriver run in 1996 was 13,840 and estimated spawning escapement was 11,399 (LaFlamme 1997). The aerial survey spawning escapement count in 1996 was 2,321.

In a joint project with the Bureau of Land Management, the Department installed a counting tower on the Gulkana River upstream of the West Fork in 2002 to estimate the escapement of chinook salmon. Preliminary analysis estimated an escapement of 6,581 chinook salmon past the tower. A radio-telemetry tracking station was installed at the tower site to provide data in conjunction with the Copper River chinook salmon radio-telemetry project that enabled the estimation of the proportion of radio-tagged chinook salmon migrating past the tower to the total



**Figure 8.-Gulkana River chinook salmon sport harvest and aerial survey index escapement counts, 1977-2001.**

entering the Gulkana River. Based upon the radio tag data, 78% of the Gulkana River chinook salmon return passed the counting tower. This resulted in a total estimate of abundance for chinook salmon in the Gulkana River at 8,462 (Sarafin *In prep*). A long-term goal of this project is to establish a chinook salmon Biological Escapement Goal (BEG) for the river.

### **Recent Fishery Performance**

During 2000, sport anglers fishing the Gulkana River drainage (Table 13) harvested 4,177 chinook salmon. This was 6% above the 1990 – 1999 average and 5% less than the 1995 – 1999 average. Whereas, the fishing effort of 25,721 angler-days in 2000 was 24% and 26% less for the respective averages (Table 5). Observed chinook salmon spawning escapement during 2000 (1,174) was the highest since 1998 (Table 8). Spawning escapement was 8% above the 1990-1999 average and 9% below the 1995 – 1999 average. Wuttig and Evenson (2001) reported 25% of radio-tagged chinook salmon in 2000 were located in the Gulkana River.

During 2001, sport anglers fishing the Gulkana River drainage (Table 13) harvested 3,274 chinook salmon. This was 17% and 26% below the 1990 – 1999 and 1995 – 1999 averages, respectively. The fishing effort of 24,852 angler-days in 2001 was 26% and 29% less for the respective averages (Table 5). Observed chinook salmon spawning escapement during 2000 (556) was the least number observed since 1995, survey conditions were poor and survey timing was late in 2001 and is responsible for the low survey number (Table 8). Spawning escapement was 49% and 57% below the 1990-1999 and 1995 – 1999 averages, respectively. Savereide and Evenson (*In prep*) reported 18% of radio-tagged chinook salmon in 2001 were located in the Gulkana River.

Since 1991 there has been a significant increase in the use of powerboats from the Richardson Highway bridge upstream for about 5 miles. Also, a notable increase in the number of guides specializing in targeting chinook salmon has occurred on the lower river (below the West Fork confluence) over the past several years. Prior to the 1986 season, only one individual specialized in guiding anglers for chinook salmon on this section of the river. During the 1987 and 1988 seasons, a minimum of eight guides operated on the lower portions of the river, while the number increased to at least ten guides during 1989 and 1990. Only eight guides registered to operate on upper Gulkana River in 2001 and 13 guides in 2002 (K. J. Mushovic, BLM, personal communication). This does not include guides that only operate downstream of the Gulkana Wild River corridor, though a majority of the guides that operate out of Sourdough, do fish below the Wild River Corridor. From 1999-2001, BLM had a moratorium on the number of guides that could register to operate in the Gulkana Wild River corridor, which limited the number of guides operating in this portion of the river during this period. Available data indicate that guided anglers are more successful than unguided anglers.

### **Management Objectives**

The underlying goal of past and current management has been to ensure sustained yield. An annual spawning escapement objective of 1,200 fish has been established, based on enumeration of spawning fish by aerial surveys. During years in which water clarity has been good enough to conduct aerial surveys, no action has been taken to restrict the fishery if spawning escapement counts of 1,000 fish are achieved in the area between the mouth of the Gulkana River and the confluence with the West Fork during the week following the Fourth of July weekend. Unfortunately, water clarity often results in poor aerial survey indices during this period and no restrictive measures have been taken. The *Copper River Chinook Salmon Fishery Management Plan* was developed to provide for chinook salmon escapement at or above average historic



levels (the escapement objective range of 28,000 – 55,000 chinook salmon was established by the BOF in 2000). This was to be achieved through a five-percent reduction in harvests of chinook salmon in the commercial and sport fisheries. In three of the past six years (1997 – 2002) since the plan was implemented, escapement counts have been above the 1987-1996 average of 951 chinook salmon and exceeded the escapement objective of 1,200 for the Gulkana River.

### **Fishery Management**

In 2000, cool temperatures and low water conditions in the lower Copper River appeared to delay the return of chinook salmon. Commercial harvests of chinook salmon on the Copper River Delta were substantially less than what was projected. Following the first three commercial fishery openings, through May 22, actual chinook salmon harvest was lagging projected harvests by 9,000. There was no commercial opening on May 26, due to lagging sonar numbers. The next three commercial openings resulted in a total harvest of 10,137 chinook salmon. From these harvest levels it appeared the chinook salmon returns were less than anticipated. This was corroborated by catch per unit effort data in the upriver chinook salmon radio-telemetry study. These data indicated that the front portion of the upper Copper River chinook salmon run during 2000 was above that for 1999. This is likely due to the commercial fishery being restricted; the inside statistical areas were closed during the first two openings. Catch rates in the research study declined and tracked below the 1999 estimates indicating a below average late run. Therefore, to provide additional chinook salmon for the drainage wide spawning escapement objective of 28,000 – 55,000 chinook salmon, a reduction of chinook salmon sport harvest was warranted. An emergency order restricting the seasonal bag limit from 4 to 2 chinook salmon 20 inches or more in length in the upper Copper River drainage was issued to go into effect on June 26. This measure was believed to have conserved 2,000-3,000 chinook salmon for the drainage-wide escapement.

High water conditions, as a result of rain and late snow melt, existed on the Gulkana River during most of the 2000 fishing season. This did not seem to hamper fishing success, as it has in the past. Anecdotal reports by sport anglers indicated that the chinook return was better than 1999, though effort on the river appeared to be reduced. Ahtna Heritage Foundation again sponsored a chinook salmon derby, though prize money was reduced to \$3,500, \$2,000, and \$1,000 for the three largest fish. Overall, fishing effort on the Gulkana River appeared to be less than recent years, particularly on the lower Gulkana River. Fewer anglers may have targeted the Gulkana River in 2000 due to high water in the Gulkana River and good chinook salmon returns to the Susitna River drainage and a strong late chinook salmon return on the Kenai River. Ahtna Heritage Foundation discontinued the fishing derby following the 2000 season, due to lack of participation and has no plans for future fishing derbies.

In 2001, chinook salmon run timing into the Gulkana River appeared to be average, chinook salmon harvests were reported in early June. River conditions were often high with poor visibility, due to rain in the upper Gulkana, which appeared to reduce angler success. In addition, fishing effort appeared to be down. There was some speculation by the public that another bag limit reduction would occur which may have reduced trips to the Copper River drainage. These conditions could have been cause for the reduced harvest observed from the Statewide Harvest Survey. Due to poor river conditions, no June aerial surveys were flown on the Gulkana River in 2001. The spawning escapement aerial survey was flown within the optimum period, but due to poor weather conditions (wind and cloud cover reducing visibility in

the river) the spawning escapement index was slightly below the escapement objective of 1,200. Had the survey been flown under good survey conditions, it is believed that the escapement objective would have been exceeded.

In 2002, chinook run timing into the Gulkana River appeared to be normal. Water conditions during the first half of June were good, as were chinook harvests. During the second weekend in June, increased fishing effort in the lower river was observed. Increase motorized boat use was observed by BLM staff conducting use counts on the river (Marcia Butorac, personal communication). While the total number of boats (motorized and non-motorized) remained at the 1996-2001 average, the number of motorized boats increased from 20% to 55% of the total boat use. This was attributed to catch and release regulation being instituted on the Kenai River, causing those anglers to move to waters where chinook salmon could be harvested. Anecdotal reports during the second weekend of June reported high fishing success, and a large percentage of daily limits being taken. During the third week in June, rain caused the river level to increase and reduced visibility, reducing fishing success. The river condition remained relatively poor throughout the season, and aside from the first two weeks of June, fishing effort was at or below normal levels for the remainder of the season.

In 1999, Ahtna Native Corporation began an access fee program for access to the Gulkana River across corporation lands (\$5 per day per person, or a \$20 individual seasonal or \$50 seasonal family pass). Access to the Gulkana River downstream of Sourdough was limited to the Richardson Highway bridge and the easement trail at mile 141 Richardson Highway if no access fee was paid. If a day or seasonal use fee was paid, access to the river included the uplands adjacent to the river and access points at Sailors Pit and Poplar Grove. A private campground that provided river access upstream of Sailors Pit for less than the Ahtna fee shifted effort from Sailors Pit to the campground. This campground was only open to the public during the 1999 and 2000 fishing seasons. Since that time, it has become a membership only (primarily guides) river access point, with limited use by the general public. The fee program also shifted effort from Sailors Pit to the Richardson Highway bridge ROW and overall fishing effort has not been reduced as a result of the access fee. Increased harvest of chinook due to the derby was minimal, due to lack of participation in the access fee program and the seasonal bag limit reduction. The derby was not continued in 2001 and 2002 due to lack of participation. Access to the lower Gulkana River will continue to be an issue, if fishing pressure begins to increase.

### **Fishery Outlook**

It is anticipated that effort and harvests of chinook in the Gulkana River will remain at current levels in the near future. The increased effort and harvests that resulted in the early 1990's may have been a result of restrictions on the Cook Inlet fisheries (Kenai, Susitna catch-and-release and closures). As these restrictions have been lifted effort on the Gulkana River has declined in recent years. The recent data indicates a potential for overharvest of the Gulkana River chinook stocks, if river conditions such as water clarity and water level are conducive to fishing success. The Copper River drainage harvest trends and aerial survey indices indicate strong chinook salmon returns in recent years, but based upon returns since 1999, it is realistic to assume runs will decrease over the next several years.

### **Recent Board of Fisheries Actions**

In 1994, a seasonal bag limit of five chinook salmon was imposed on the UCUSMA fisheries and guides were restricted from fishing while accompanying clients. Both restrictions were implemented to reduce the harvest potential on chinook salmon stocks in the area that are

considered fully utilized. In 1996, as part of the *Copper River Chinook Salmon Fishery Management Plan*, guides were restricted from operating in the flowing waters of the Copper River drainage on Tuesdays. No other proposals were passed during the 1996 BOF meeting regarding chinook salmon sport fishing in the Gulkana River.

During the 1999 BOF meeting, the Board passed two proposals specific to the Gulkana River, one specific to chinook salmon, the other impacting chinook salmon anglers on the upper Gulkana River. The regulation concerning chinook salmon clarified the single-hook, artificial fly regulation, for the area downstream of the Richardson Highway bridge. The regulation now has a specific hook size (3/4-in or less) and distance that weight can be used in front of the hook (18"). The second regulation, designed to protect rainbow and steelhead trout, permits only unbaited, single-hook artificial lures in the Gulkana River, with the exception of the single-hook, artificial fly area from June 1 to July 31 and the mainstem Gulkana River upstream of the Richardson Highway bridge to an ADF&G marker 7 ½ miles upstream of the confluence with the West Fork from June 1 to July 19. This regulation permits bait in the main chinook salmon fishing area of the Gulkana River during the open season. Copper River drainage-wide revisions to the *Copper River Chinook Salmon Fishery Management Plan* included lifting guiding restrictions and reducing the seasonal bag limit from five to four. There are no Board of Fisheries proposals directed specifically at the Gulkana River chinook salmon fishery for the 2002 meeting. There are several directed at restricting the chinook salmon fishery in the upper Copper River drainage, that will impact the Gulkana River.

### **Current Issues**

Increased use by float and powerboat operators on the Gulkana River is intensifying conflicts between users. Float-boat operators fish primarily from the bank casting and drifting lures through the holes while powerboats back troll. Additionally, reports have been made by float-boat operators that powerboats have bumped into them. The Bureau of Land Management initiated the process of updating the management plan for the Wild portion of the Gulkana River upstream of Sourdough in 1998. A private consulting firm was awarded the contract and gathered management recommendations through a process called Limits of Acceptable Change. Prior to the final recommendations being completed, the consulting firm discontinued its work and the project was reassigned to another contractor. Preliminary recommendations for the management plan have been distributed for agency and public comment. Completion of the plan is set for 2003. There were two proposals submitted for the 1999 BOF meeting regarding motorized use on the Gulkana River. Neither of these were addressed, as they fell outside the purview of the BOF. There is one proposal submitted for the 2002 BOF meeting requesting the prohibition of motorized boats for fishing and transporting on the entire Gulkana River drainage.

The majority of the land adjacent to the Gulkana River downstream of Sourdough is owned by the Ahtna Native Corporation. Beginning during the 1991 season, this corporation prohibited trespass across its lands for the purpose of hunting or fishing because it felt its customary and traditional lifestyle has been jeopardized by elimination of the rural preference in the subsistence law. Ahtna Corporation, in conjunction with the Department of Transportation, is planning the development of a public use area on its lands near the Richardson Highway bridge, a popular fishing and camping site where land ownership is in dispute. As previously mentioned, an access fee was initiated in 1999 for access to the Gulkana River across Corporation lands. Many anglers voiced dissatisfaction with the fee and shifted their efforts to the non-fee areas (Richardson Highway bridge and upstream of Sourdough). Some of this animosity toward the

fee may have resulted in less participation in the fishing derby sponsored by Ahtna Heritage Foundation, resulting in its discontinuation. Overall, effort has not been reduced due to the access fee program.

The allocation of Copper River drainage chinook salmon between subsistence, sport, and commercial uses remains a controversial issue. The *Copper River Chinook Salmon Management Plan* was developed during the BOF meeting in 1996. The plan has an “insurance plan” that reduces harvest by commercial, personal use, and sport fisheries to allow more chinook on the spawning grounds. The plan was written with a sunset clause of December 31, 2002 to allow the department to further research the Copper River chinook populations. There were several proposals submitted for the 1999 BOF meeting that addressed the modification or repeal of the current management plan. As a result, the management plan was modified, but still contains the sunset clause and direction to the department to develop a management plan that provides for high sustained yield. The Department has submitted a proposal for the 2002 BOF meeting seeking to remove the sunset clause in the management plan and maintain the current plan. The plan, along with environmental and other factors, has effectively reduced chinook harvests and increased chinook salmon spawning escapement since 2000.

### **Ongoing and Recommended Research and Management Activities**

The department has determined that the mail survey accurately estimates the harvest of chinook salmon in this drainage, therefore we do not recommend that creel surveys be conducted on an annual basis.

Managers depend on aerial surveys to index the escapement of chinook. These are, at best, post season indicators of relative spawning abundance due to their dependence on survey conditions, surveyor, and the residence of fish in the survey area. In 1996, a weir was operated in the Gulkana to count returning adult chinook salmon and verify aerial counts. The weir project was discontinued after one year and does not provide a reliable expansion factor with a single data point. The initiation of the Gulkana River counting tower project in 2002 will hopefully result in a BEG set for the Gulkana River chinook salmon stocks, but a 5-10 year database needs to be collected. The operation of the counting tower does provide inseason data, which once a historic record is built, will provide managers with data previously unavailable.

Coded wire tagging of chinook smolt was begun in 1997 with the purpose of determining the contribution of various stocks to the total chinook run in the Copper River. Coded wire tag returns in the commercial fishery will also indicate the run timing of different Copper River chinook stocks and whether one stock (the Gulkana River stock) can serve as a gauge of the abundance of other chinook stocks. Unfortunately, after two years of tag recovery, returns have been insufficient to meet the project objectives and the project will be discontinued (Sarafin, *In prep*). Aerial surveys will be continued to index numbers of spawning salmon, and the results compared to future tower counts. Since 1999, a radio-telemetry study on the Copper River has provided annual estimates of total upriver escapement, as well as migratory timing through the Chitina Subdistrict subsistence fishery, timing into the spawning tributaries, and distribution and proportion of chinook in spawning tributaries (Evenson and Wuttig 2000, Wuttig and Evenson 2001, Savereide and Evenson *In prep*).

Recommended research projects are the continuation of the radio-telemetry and Gulkana River counting tower projects. Several additional years of radio-telemetry escapement abundance estimates would provide data to compare to aerial survey indices. In addition, estimates of the

proportion of contribution of spawning escapements in index streams (including the Gulkana River) to total escapement would clarify if the index streams were actually representative of the total return. In addition, the Gulkana River counting tower data can provide the information necessary to determine what proportion of chinook salmon spawners are indexed by aerial survey. Management projects should include continued aerial survey data collection and, if possible, establish aerial survey escapement count data for June for the Gulkana River.

## **Klutina River Chinook Salmon Sport Fishery**

### **Background and Historical Perspective**

The Klutina River supports the second largest sport fishery for chinook salmon in the UCUSMA. This semi-glacial river drops rapidly out of Klutina Lake to enter the Copper River at the community of Copper Center. Access to the river is available along the Richardson Highway and from the Klutina Lake Road (also called the Brenwick-Craig Road), which parallels the river. Shore anglers participate in the fishery adjacent to the Richardson Highway and the Klutina River road. The distance between the Klutina River road and the river varies along the course of the road, with the road running along the ridge above the river. Much of the land between the road and the river belongs to the Ahtna Native Corporation and beginning in 1998, an access permit is required to be purchased prior to crossing Corporation lands. Fees in 1998 were \$5 per day per person for a day use access permit and \$10-\$30 per night for camping. Jet riverboats are used by experienced operators to access the upstream portions of the river. Jet boats are launched from private land adjacent to the highway or from a site within the highway ROW along the new Richardson Highway bridge. The river has considerable stretches of whitewater and is considered to be very challenging to jet riverboat operators. The fast water of the Klutina River limits the number of resting pools for chinook salmon, therefore there are less than two dozen good fishing sites in the lower portion of the river accessible to most anglers.

Chinook salmon typically begin entering the Klutina River in late June, with the run continuing into August. The sport fishery typically peaks during the second week of July, but fishing for chinook salmon continues until the season closes on August 1. Peak spawning occurs from late July through August. Most spawning occurs upstream of a point adjacent to mile 19.2 on the Klutina Lake road.

Chinook salmon spawning season closures were established in the UCUSMA during the 1989 BOF meeting to allow chinook salmon to spawn unperturbed. On the Klutina River upstream of a department marker located adjacent to Mile 19.2 of the Klutina Lake road, chinook salmon may be taken only from January 1 through July 19. Downstream of this marker, the chinook salmon season is from January 1 through July 31. The current bag and possession limits governing the sport fishery for chinook salmon over 20 inches is one fish. The Upper Copper River drainage-wide seasonal bag limit of four chinook salmon per year includes the Klutina River.

Sport harvest of chinook salmon from the Klutina River drainage has been estimated using the mail survey since 1983 (Mills 1979-1994), Howe et al. (1995-2000), Walker et al. *In prep.* Based on this survey, the sport harvest of chinook salmon from the Klutina River drainage averaged 2,261 fish from 1990 through 1999, ranging from a low of 583 fish in 1990 to a high of 3,489 fish in 1999 (Table 14, Figure 9). Harvests remained relatively stable from 1983 to 1990. From 1990 to 1999, sport effort on the Klutina River averaged approximately 10,483 angler-days, ranging from 5,556 in 1990 to 15,687 in 1999 (Table 5). Due to the nature of the mail survey, we do not know how much of this effort was directed toward chinook salmon versus

**Table 14.-Sport harvest and spawning escapement indices of chinook salmon in the Klutina River drainage from 1983-2001.**

Year	Sport Harvest	Observed Spawning Escapement
1983	189	228
1984	667	353
1985	249	37
1986	710	433
1987	495	333
1988	483	183
1989	652	255
1990	583	86
1991	1,709	237
1992	1,075	26
1993	1,989	<sup>a</sup>
1994	2,189	325
1995	2,485	34
1996	3,142	281
1997	3,344	1,366
1998	2,608	1,358
1999	3,489	555
2000	1,303	124
2001	1,465	99
<b>1990-1999<sup>b</sup></b>	<b>2,261</b>	<b>474</b>
<b>1995-1999<sup>b</sup></b>	<b>3,014</b>	<b>719</b>

<sup>a</sup> No aerial survey conducted in 1993.

<sup>b</sup> Average value for the years depicted.

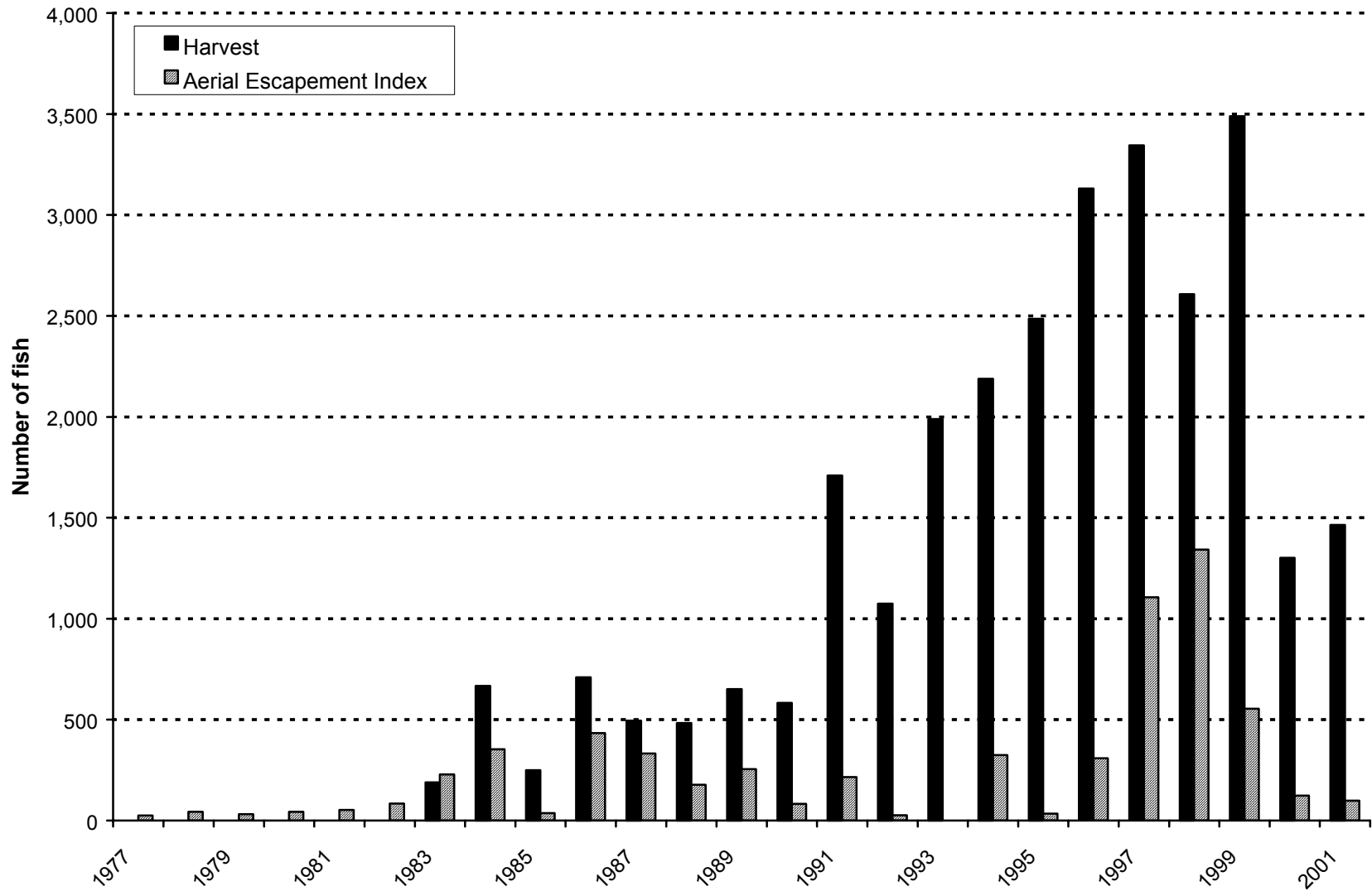


Figure 9.-Klutina River chinook salmon sport harvest and aerial survey index escapement counts, 1977-2001.

other species. Observations in recent years, however, suggest that a majority of the recent effort is directed toward chinook salmon.

During 1988 and 1989, creel surveys of the sport fishery targeting chinook salmon in the Klutina River drainage were conducted. High water reduced effort and catch during a significant portion of the 1988 season, whereas river conditions remained favorable throughout the 1989 season. Results of the 1988 survey (Roth and Delaney 1989) indicated that sport anglers caught a total of 1,048 chinook salmon of which 43% were retained. The estimated harvest (450) was close to that reported in the mail survey for 1988 (483), indicating that the mail survey fairly accurately estimates sport harvest in this fishery. In 1989 the creel survey estimate was 1,587 chinook salmon caught of which 65% were retained (Potterville and Webster 1990). The estimated harvest (1,031 fish) was again reasonably close to that reported in the mail survey for 1989 (652 fish). The 1988 creel survey showed that guided boat anglers accounted for nearly 90% of the catch and 80% of the harvest of chinook salmon. During the 1989 survey, boat anglers accounted for 88% of the estimated total catch and exhibited significantly higher catch (3.3 fish per hour) and harvest (2.1 fish per hour) rates than did shore anglers (0.5 and 0.4 fish per hour, respectively). The vast majority of boat anglers that participated in the fishery were guided and therefore insufficient data were available to determine if guided boat anglers had different catch or harvest rates than unguided boat anglers. Daily estimates of CPUE from the 1988 survey were used to estimate the timing of chinook salmon into the fishery. These data indicate that CPUE peaks during mid-July, with 50% of the run having entered the river by late July. Approximately 12 guides operated on the Klutina River during 1989 and 1990, all of which conducted boat trips. The vast majority of shore anglers fished downstream from the Richardson Highway bridge.

The spawning escapement of chinook salmon to the Klutina River has been documented by aerial surveys of St. Anne and Manker creeks since 1966 (Table 8). Spawning escapement has averaged 218 fish during 1977-1986, ranging from a high of 433 in 1986 to a low of 25 in 1977. Since 1987, observed escapements to this drainage have remained stable, the average escapement for 1987-1996 being 257 (Table 14). The observed escapements in 1997 and 1998 were the highest on record with an average in those two years of 1,233. No escapement surveys were flown on the Klutina River index areas in 1993. Since 1999, poor survey conditions and pilot availability have caused surveys to be flown outside the optimum survey period, and these indices likely do not represent the Klutina River chinook return accurately. The 2-mile stretch of the river just below the lake is known to support chinook salmon spawning, but due to the turbid water conditions in this area, it is not possible to assess abundance of spawning fish.

### **Recent Fishery Performance**

The 2000 sport harvest of 1,303 chinook salmon was the lowest since 1992 and accounted for about 24% of the estimated total sport harvest of chinook salmon in the UCUSMA. The harvest in 2000 was 42% less than the 1990 – 1999 average. Effort in 2000 was estimated at 11,125 angler-days, which was 6% higher than the 1990-1999 average. The aerial escapement count for index streams in the Klutina River drainage in 2000 was 124. The 2000 escapement of chinook salmon to index sites in the Klutina River drainage, was the lowest since 1995, not including 2001 surveys (Table 8). Wuttig and Evenson (2001) reported 27% of radio-tagged chinook salmon in 2000 were located in the Klutina River.

The 2001 sport harvest of 1,465 chinook salmon was the second lowest harvest since 1992 and accounted for about 30% of the estimated total sport harvest of chinook salmon in the



UCUSMA. The harvest in 2001 was 35% less than the 1990 – 1999 average. Effort in 2001 was estimated at 8,960 angler-days, which was 15% less than the 1990-1999 average. The aerial escapement count for index streams in the Klutina River drainage in 2001 was 99. The 2001 escapement of chinook salmon to index sites in the Klutina River drainage, was the lowest since 1995 (Table 8). Savereide and Evenson (*In prep*) reported 26% of radio-tagged chinook salmon in 2001 were located in the Klutina River.

### **Management Objectives**

No specific fishery objectives have been established for this stock. An underlying goal of past and current management, however, has been to ensure sustained yield. Aerial survey index evaluation does not appear to represent the majority of spawning fish in this system and has been used as a post-season escapement index, with the realization that the majority of spawning occurs in the glacially occluded mainstem Klutina. From 1999-2001, data gathered from the radio-telemetry study indicated 69-78% of radio-tagged chinook salmon entering the Klutina River remained in the mainstem. In addition, run timing of chinook spawning in the index streams is earlier than mainstem Klutina River spawners. Based upon this information, it appears the two escapement index streams are likely not representative of the entire Klutina River escapement.

### **Fishery Management**

In 2000, cool temperatures and low water conditions in the lower Copper River appeared to delay the return of chinook salmon. Commercial harvests of chinook salmon on the Copper River Delta were substantially less than what was projected. Following the first three commercial fishery openings, through May 22, actual chinook salmon harvest was lagging projected harvests by 9,000. There was no commercial opening on May 26, due to lagging sonar numbers. The next three commercial openings resulted in a 10,137 chinook salmon harvest total. From these harvest levels it appeared the chinook salmon returns were less than anticipated. This was corroborated by catch per unit effort data in the upriver chinook salmon radio-telemetry study. This data indicated that the front portion of the upper Copper River chinook salmon run during 2000 was above that for 1999. This is likely due to the commercial fishery being restricted; the inside statistical areas were closed during the first two openings. Catch rates in the research study declined and tracked below the 1999 estimates, which indicated a below average or late run. Therefore, to provide additional chinook salmon for the drainage wide spawning escapement objective (28,000 – 55,000 chinook salmon), a reduction of chinook salmon sport harvest was warranted. An emergency order restricting the seasonal bag limit from 4 to 2 chinook salmon 20 inches or more in length in the upper Copper River drainage was issued to go into effect on June 26. This measure was believed to conserve 2,000-3,000 chinook salmon for the drainage-wide escapement. Harvest of chinook salmon for the Copper River drainage declined in 2000, but river conditions on the Klutina River were likely more responsible for that decline, than the regulatory measure.

In 2000 and 2001, no inseason management assessment was conducted on the Klutina River. Harvest and catch data for the Klutina River chinook salmon stocks are obtained from the SWHS. In 2000 and 2001, aerial surveys were flown on the index streams after the peak period, due to poor weather conditions. The escapement index was below the escapement objective of 250, with the majority of chinook salmon observed in St. Anne Creek during both years. The number of chinook observed in Manker Creek was substantially less than the historic average in both years. Due to poor fishing conditions user conflicts on the Klutina River were less during

2000-2001. Many guides continue to report abuse of the daily and seasonal bag limits by shore-based anglers fishing the mouth of the Klutina River. There are increasing conflicts between float anglers and motorized boat anglers, as well as between guides and non-guided anglers. There are limited chinook salmon holding areas on the Klutina River and it is anticipated that these conflicts will not diminish, particularly as effort increases.

In 2000, high water conditions during late June and most of July severely limited sport fishing effort on the Klutina River. During much of this period, guides were not taking on clients. Due to the poor fishing conditions and limited fishing effort the Ahtna Heritage Foundation fishing derby on the Klutina River was cancelled. Aside from mid-June and the last 10 days of July sport fishing effort on the Klutina River was non-existent. As a result, the sport harvest was below the 1990-1999 average of 2,261 chinook salmon. Guides and anglers were reporting excellent fishing and large numbers of chinook salmon in late July when sport fishing resumed.

In 2001, high water conditions during late June and July again severely limited sport fishing effort on the Klutina River. While fishing time was not as limited as 2000, fishing effort and chinook salmon sport harvests were reduced as a result of river conditions. As a result of a department oversight in a proposal passed by the BOF during the 1999 meeting, the use of bait in the Copper River mainstem has been prohibited since 2000. A popular fishery for shore based anglers at the confluence of the Copper and Klutina rivers has developed in recent years, which was impacted by this regulation change. This may have been part of the cause of the reduced effort and harvest during 2000-2001.

The Klutina River during the 2002 chinook salmon season did not experience the high water conditions it had during the previous two years. Anecdotal reports indicated a strong early return to the Klutina River; with chinook salmon harvests reported in the lower river as early as mid-June. Fishing success was reported good throughout the entire season. As a result of the favorable river conditions, fishing effort and harvests appeared to have increased. The bait restriction on the Copper River was removed through emergency order on June 1 to provide for the chinook salmon fishery that occurred at the confluence. As result of the high water, the confluence configuration had changed, which forced anglers to shift efforts downstream of the Klutina River mouth in the mainstem Copper River. In addition, at least one commercial operator began transporting anglers to this area. On several occasions from mid-June to July 19<sup>th</sup> (when the Copper River closes to chinook salmon fishing) at least two dozen anglers were observed fishing in this area with relatively high levels of fishing success. Whether these anglers had relocated from the lower Klutina River (downstream of the Richardson Highway bridge) or new anglers was not determined.

Aerial surveys flown in 2002 were flown within the optimum period. Indices for both index streams were near historic averages prior to 1996, and the Klutina River escapement index of 260 was slightly above the escapement objective.

Ahtna Native Corporation continued the access fee program for the Klutina River road in 2000-2002. There appeared to be fewer complaints regarding the fee in during these years than in 1998 and 1999, as users became accustomed to the program and the corporation publicized the program.

### **Fishery Outlook**

It is anticipated that the increasing trend in effort and harvest of chinook in the Klutina River will stabilize in the near future. The higher levels of effort and harvest that resulted in the early

1990's may have been a result of restrictions on the Cook Inlet fisheries (such as catch and release restrictions and closures for the Kenai and Susitna rivers). As these restrictions have been lifted, effort has declined slightly in recent years for the Klutina River. The recent data indicates the potential for overharvest of the Klutina River chinook stocks, particularly if fishing conditions on the Gulkana River are poor and effort is shifted to the Klutina River where water conditions do not impact chinook salmon fishing as significantly as the Gulkana River (with the exception of the 2000 and 2001 fishing season). The Copper River drainage harvest trends and aerial survey indices indicate strong chinook salmon returns in recent years, but based upon returns since 1999, it is realistic to assume runs will decrease over the next several years.

### **Recent Board of Fisheries Actions**

During the 1996 BOF meeting, as part of the *Copper River Chinook Salmon Fishery Management Plan*, guides were restricted from operating in the flowing waters of the Copper River drainage on Tuesdays. Other actions during the 1996 BOF meeting included closure of sport chinook salmon fishing in Manker Creek, Klutina Lake and all flowing waters entering Klutina Lake. In addition, the season date closure for chinook salmon was moved from August 10 to August 1 for the flowing waters downstream of the department markers located at mile 19.2 on the Klutina Lake road. These measures were taken to protect spawning chinook salmon. At the 1999 BOF meeting, no action was taken specific to the Klutina River chinook fishery. Copper River drainage-wide revisions to the *Copper River Chinook Salmon Fishery Management Plan* included lifting guiding restrictions and reducing the seasonal bag limit from five to four. There are several proposals directed at extending the chinook salmon fishing season on the Klutina River submitted to the BOF for the 2002 meeting.

### **Current Issues**

The sport fishery for chinook salmon in the Klutina River has, in recent years, taken a higher proportion of chinook salmon returning to the upper Copper River (Table 11). This has resulted from an increase in the number of guides operating in the fishery, increased angler access to salmon holding areas, and a general increase in angler proficiency. Greater exploitation rates increase the risk of overharvest during years of low production and high angler effort. Further harvest increases may make further restrictions to the fishery necessary.

The majority of the land adjacent to the Klutina River upstream of the Richardson Highway is owned by Ahtna Native Corporation. Beginning during the 1991 season, this corporation prohibited trespass across its lands for the purpose of hunting or fishing. The corporation is not allowing free access for hunting or fishing purposes because it feels its customary and traditional lifestyle has been jeopardized by elimination of the rural preference in the state subsistence law. It has conducted an access fee program since 1998 to allow access to the upper Klutina River. If fees increase without increased access this may result in conflicts between fishery users and the corporation or increased congestion in areas of the Klutina River that are not corporation lands.

A large component of the guides, charter operators, and businesses on the Klutina River have formed a Klutina River Association. Until 2002, Ahtna Native Corporation was involved with the association and would not issue a land access permit to a guide or operator unless the individual/business was a member of the Klutina River Association. This has caused some conflict amongst the various guides and operators on the Klutina River.

Princess Lodge purchased University of Alaska property on the Klutina River in 1999, and began construction for a lodge in 2000. The lodge opened in May of 2002. Undoubtedly the lodge and

its clientele have the potential to dramatically increase fishing pressure not only on the Klutina River, but possibly the Gulkana River and other Copper River tributaries as well. The development of Wrangell-St. Elias National Park and the completion of the new park visitor center (located in Copper Center) in summer 2002 also has the potential for attracting tourists with sport fishing interests. Following the first season, there was an increase in river traffic (float trips and motorized boat tours) on the Klutina River, Copper River mainstem and other tributaries. Under the current State guide registration program, the department is unable to determine the actual number of guides operating on a water body in a given season, though there was anecdotal information of several new guides operating in the Copper River tributaries in 2002. If sport fishing effort does increase as a result, BOF action will need to be taken to maintain current harvest levels.

Increasing use of the swift Klutina River by powerboats and limited use by rafts creates a greater hazard to users. Many sections of the river are not wide enough to allow boats to pass and result in conflicts between the two user groups. This is not an issue unique to the Klutina River, similar conflicts occur on the Gulkana River. During fall 2001, the Department of Transportation improved the access road and parking area at the Klutina River boat launch within the Richardson Highway ROW. At a public meeting held in August 2002, members of the Klutina River Association voiced their opposition to the improvements, citing safety issues and increase dangers of inexperienced boaters operating on the river. Other members of the public supported the project, as did the department for improved public access to the river. While funding is available to finish the road and parking area, DOT requires additional funding to make any further improvements on the launch itself and as a result future boat launch improvements are on hold.

### **Ongoing and Recommended Research and Management Activities**

The department has determined that the mail survey accurately estimates the harvest of chinook salmon in this drainage; therefore, we do not recommend that creel surveys be conducted on an annual basis. However, the nature of the chinook fishery has changed since the last creel survey was conducted (1989), effort has doubled and harvests have averaged three times higher. The fishery should be examined through a creel survey to determine if angler efficiency has increased, and if distribution of effort has shifted.

Managers depend on aerial surveys to index the escapement of chinook. These are, at best, indicators of relative spawning abundance rather than absolute abundance due to their dependence on survey conditions, surveyor, and the residence of fish in the survey area. Aerial survey index counts do not appear to evaluate the majority of spawning fish in this system. A proportion of the spawning occurs in the glacial waters of the mainstem Klutina River. The radio-telemetry study has provided initial information regarding mainstem spawning, but the continuation of this project is needed to determine if the proportion is a consistent level each year. If this could be determined, the index stream counts would provide a better indication of total chinook escapement for the Klutina drainage.

Coded wire tagging of chinook smolt was begun in 1997 with the purpose of determining the contribution of various stocks to the total chinook run in the Copper River. Coded wire tag returns in the commercial fishery will also indicate the run timing of different Copper River chinook stocks and whether one stock (the Gulkana River stock) can serve as a gauge of the abundance of other chinook stocks. Unfortunately, after two years of tag recovery, returns have been insufficient to meet the project objectives and the project will be discontinued (Sarafin, *In*

*prep*). Aerial surveys have continued to index numbers of spawning salmon. Since 1999, a radio-telemetry study on the Copper River has provided annual estimates of total upriver escapement, as well as migratory timing through the Chitina Subdistrict subsistence fishery, timing into the spawning tributaries, and distribution and proportion of chinook in spawning tributaries (Evenson and Wuttig 2000, Wuttig and Evenson 2001, Savereide and Evenson *In prep*).

Recommended research and management projects are the continuation of aerial surveys and radio-telemetry projects. Several additional years of radio-telemetry escapement abundance estimates would provide data to compare to aerial survey indices. In addition, estimates of the proportion of spawning escapements in index streams to total escapement would clarify if the aerial survey index streams were representative of the total return. A portion of the chinook salmon hooked in the Klutina River are lost in the fast water before they can be landed. It is suspected that many of these fish may not survive to spawn. The hooking mortality of these fish needs to be evaluated.

## **Other Copper Basin Chinook Salmon Sport Fisheries**

### **Background and Historical Perspective**

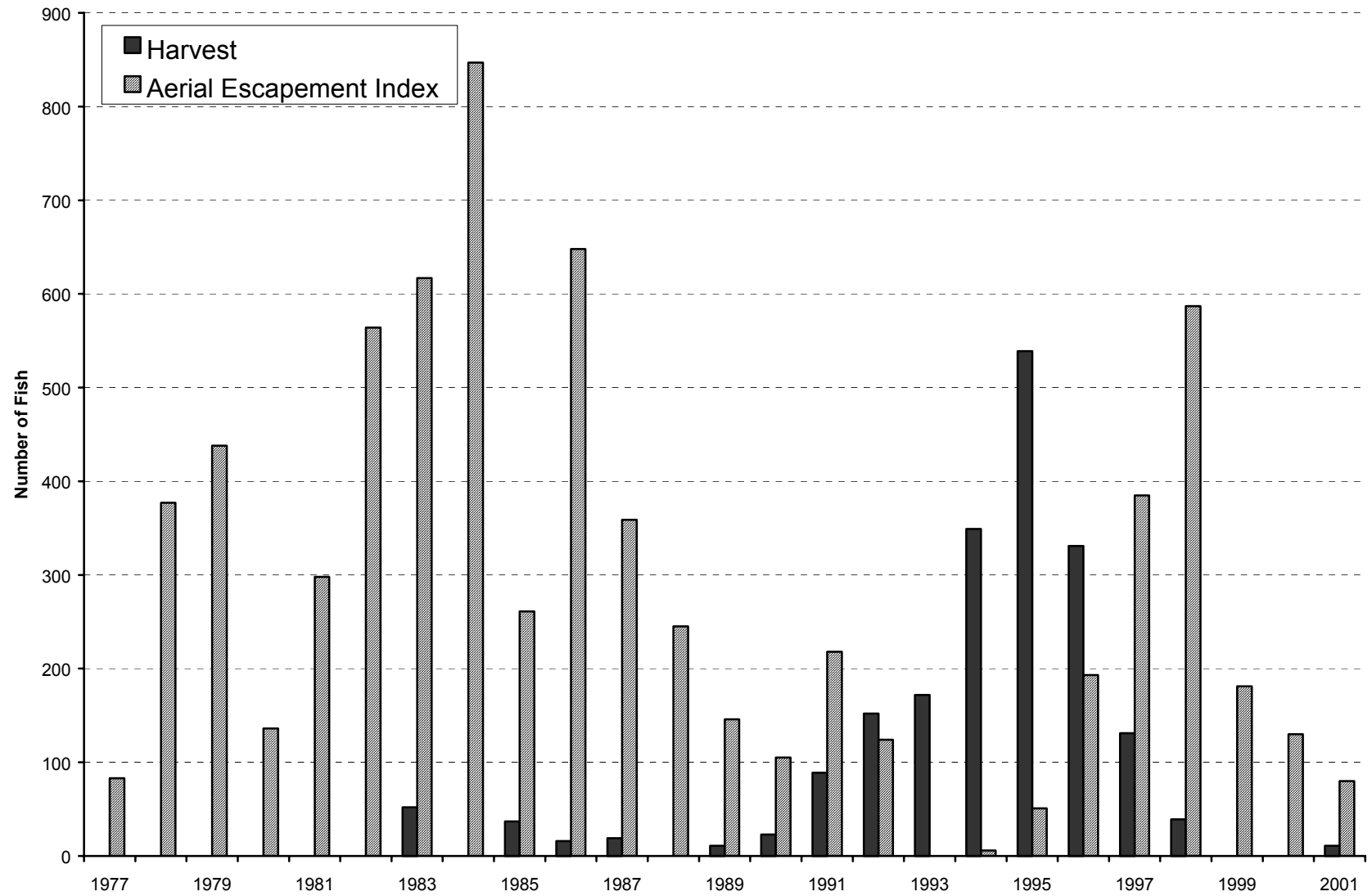
Less than 10% of the harvest of chinook salmon in the UCUSMA occurs in systems other than the Gulkana and Klutina rivers. The majority of this harvest occurs in the Tonsina River. The glacial Tonsina River flows from Tonsina Lake into the Copper River downstream of the Klutina River confluence. The Tonsina River crosses under the Richardson Highway at mile 79 and the Edgerton Highway at mile 19. Shore anglers participate in the fishery adjacent to the Edgerton Highway; some angling is conducted by raft between the Richardson and Edgerton highways; and some angling is conducted by fly-in anglers fishing the outlet of the Tonsina River at Tonsina Lake. Chinook salmon run-timing to the Tonsina River drainage occurs in late-June through August, similar to that of the Klutina River.

The Tonsina River chinook salmon sport fishery harvest increased annually from 1988 to 1995 (Table 11, Figure 10). Harvests averaged 19 fish from 1977-1989 and 183 fish from 1990 – 1999. The recent 5-year average (1995-1999) is 208, though no chinook salmon harvests were reported in 1999 and 2000. Creel surveys or fishery monitoring of catch or catch rates have not been conducted on the Tonsina River due to low fishing effort and low chinook salmon catches

within this drainage. Fish and Wildlife Protection and Department of Fish and Game personnel do, however, conduct enforcement monitoring of this fishery on a sporadic basis.

The spawning escapement of chinook salmon to the Tonsina River has been documented by aerial surveys of the Little Tonsina River and Greyling Creek since 1966 (Table 8, Figure 10). The spawning escapement to these index sites averaged 602 fish from 1977 to 1986, but the average index count for 1987 – 1996 declined to 228.

Current regulations allow sport fishing for chinook salmon in the Tonsina River from January 1 through July 19. The July 19 closure date was established in 1989 to allow chinook salmon to spawn unimpeded. Current daily bag and possession limits for chinook salmon over 20 inches in this drainage are one and one, respectively, with a seasonal bag limit of four for the Copper River drainage.



**Figure 10.-Tonsina River chinook salmon sport harvest and aerial survey index escapement counts, 1977-2001.**

A limited fishery for chinook salmon also occurs on Kiana Creek in the Tazlina River drainage. The average escapement for Kiana Creek from 1977 to 1986 was 234 salmon and for 1987 through 1996 was 392 (Table 8). The returns to Kiana Creek from 2000-2002 were below the 1987 – 1996 average, though the survey was conducted outside the optimum survey time due to poor survey conditions in two of those years. Harvests in this fishery have averaged less than 50 fish since 1990.

### **Management and Fishery Objectives**

No specific fishery objectives have been established for these stocks. An underlying goal of past and current management, however, has been to ensure sustained yield. It is uncertain whether aerial survey index evaluation represents the majority of spawning fish in these systems and it has been used as a post-season escapement index with the realization that the majority of spawning may occur in the glacially-occluded mainstem of the Tonsina and Tazlina rivers. Data gathered from the radio-telemetry study has begun to provide information regarding the contribution to the upper Copper River chinook salmon stock these systems represent. As additional years of data are collected, it can be determined whether the two escapement index streams are representative of the entire system's escapement.

### **Recent Board of Fisheries Actions**

During the 1996 BOF meeting, sport chinook salmon fishing was closed in all tributaries to the Tonsina River, Tonsina Lake and all flowing waters entering the lake. Additionally, the Chokosna and Gilahina rivers and all clearwater tributaries of the Gakona River, Tazlina Lake and all flowing waters entering Tazlina Lake except ¼ mile radius around the mouth of Kiana Creek.

The primary biological concern regarding the Tonsina River chinook salmon stock in recent years is the extremely low chinook salmon escapements in the Little Tonsina River. The trend in harvest does not match the trend in escapement within this drainage (Figure 10). The problem, therefore, is reduced production, overharvest within one of several other mixed-stock fisheries, or the result of illegal fishing activities within the Tonsina River drainage. In response to this concern, the use of bait was restricted and only unbaited, single hook, artificial lures were permitted following the 1996 BOF meeting. In addition, all tributaries to the Tonsina River, Tonsina Lake and all flowing waters entering Tonsina Lake were closed to sport fishing to protect spawning chinook salmon. As a result of these restrictions, harvest and effort in 1997 and 1998 were both below the ten-year average. At the March 1999 BOF meeting, the bait restriction was modified to allow bait to be used with a hook gap of 3/8 inch or less. This regulatory modification was made to permit fisheries for Dolly Varden and Arctic grayling in the Tonsina River using traditional gear to harvest these species, while still reducing the harvest of chinook salmon. During the December 1999 BOF meeting, Copper River drainage-wide revisions to the *Copper River Chinook Salmon Fishery Management Plan* included lifting guiding restrictions and reducing the seasonal bag limit from five to four. There is one public proposal submitted to the 2002 BOF meeting requesting the bait restriction be removed from the Tonsina River. A department proposal asks for the unbaited, single-hook, artificial lure regulation to be removed from the ¼ mile radius around the mouth of Kiana Creek. This was unintentionally instituted at the 1999 meeting for protection of rainbow trout and steelhead and not to restrict this fishery.

### **Current Issues**

Recent increases in harvests in the Copper River drainage may be attributed to poor chinook salmon returns on the Kenai and Susitna rivers. Media coverage of strong returns to the Copper River may also be responsible. In the near future, it is anticipated that effort will continue to remain at current levels or increase further, depending on the previously mentioned factors. The recent strong chinook salmon returns to the Copper River have prevented the overexploitation of chinook salmon stocks. If the Copper River experiences below normal chinook salmon returns, managers will need to take inseason action to prevent potential overexploitation. Currently, limited effort has occurred on chinook salmon streams other than the Gulkana and Klutina rivers. The majority of the secondary systems have relatively small chinook salmon returns and any significant development of a fishery on these systems could put these small chinook salmon stocks at risk.

### **Ongoing and Recommended Research and Management Activities**

The level of responses to the SWHS for these systems (less than 20 in 1998) does not provide useable estimates of harvest, but do provide indications of harvest trends. If effort and harvest on these systems did increase significantly, it would be reflected in the SWHS. In these smaller chinook salmon fisheries (Tonsina River and Kiana Creek), harvests at current levels appear sustainable. Any increase in current harvests, may not be sustainable.

Managers depend on aerial surveys to index the escapement of chinook. These are, at best, indicators of relative spawning abundance, rather than absolute abundance estimates, due to their dependence on survey conditions, surveyor, and the residence time of fish in the survey area. Aerial survey index counts do not appear to evaluate the majority of spawning fish in this system. A proportion of the spawning occurs in the glacial waters of the mainstem Tonsina and Tazlina rivers. From 1999-2001 approximately 85% of chinook salmon returning to the Tonsina River were spawning in the mainstem, based upon radio-telemetry data. If this proportion of spawners remains consistent, another index of spawning abundance other than the index stream counts may be required to provide a better indication of total chinook salmon escapement for these drainages. The Tazlina River return represents less than 5% of the total Upper Copper River chinook salmon escapement, and it appears a relatively small amount of mainstem spawning occurs, but due to small sample size the proportion cannot be determined (Savereide and Evenson *In prep*).

Coded wire tagging of chinook smolt was begun in 1997 with the purpose of determining the contribution of various stocks to the total chinook run in the Copper River. Coded wire tag returns in the commercial fishery will also indicate the run timing of different Copper River chinook stocks and whether one stock (the Gulkana River stock) can serve as a gauge of the abundance of other chinook stocks. Unfortunately, after two years of tag recovery, returns have been insufficient to meet the project objectives and the project will be discontinued (Sarafin, *In prep*). Aerial surveys will be continued to index numbers of spawning salmon. Since 1999, a radio-telemetry study on the Copper River has provided annual estimates of total upriver escapement, as well as migratory timing through the Chitina Subdistrict subsistence fishery, timing into the spawning tributaries, and distribution and proportion of chinook in spawning tributaries (Evenson and Wuttig 2000, Wuttig and Evenson 2001, Savereide and Evenson *In prep*). Data from 1999-2001, indicates that the Tonsina River chinook salmon return represents over 20% of the total Copper River return, similar to the Gulkana and Klutina river returns.



Recommended research and management projects are the continuation of aerial surveys and the radio-telemetry project. Several additional years of radio-telemetry escapement abundance estimates would provide data to compare to aerial survey indices. In addition, estimates of the proportion of spawning escapements in index streams to total escapement would clarify if the index streams were representative of the total return.

## **SOCKEYE SALMON SPORT FISHERIES**

In the UCUSMA, only the Copper River drainage supports wild and enhanced stocks of sockeye salmon. Wild stocks are widely distributed and are present in approximately 125 of the Copper River tributaries, while enhanced stocks are limited to the Gulkana River from production at the Gulkana Hatchery near Paxson. The abundance of sockeye salmon migrating into the Copper River has been estimated annually since 1978 by sonar at Miles Lake. Beginning in 1966, the escapement of sockeye salmon to the Copper River tributaries has been documented by aerial surveys of index sites to monitor spawner distribution in the drainage (Brady et al. 1991). This aerial survey program was discontinued in 1993; however, a reduced program, which targeted high priority index sites, was reinstated during the 2000 season.

Throughout the past decade, the sockeye salmon sport fisheries of the UCUSMA have undergone a rapid expansion. Since 1996, the sockeye salmon sport harvest has exceeded 11,000 fish annually, compared to a previous high of 6,533 fish harvested in 1994 (Table 15). Area harvests of 12,361 and 8,160 sockeye salmon during 2000 and 2001, respectively, were the largest and sixth largest harvests since 1977. The primary sport fisheries occur in the Gulkana and Klutina rivers. Approximately 93% of the estimated sport harvest of sockeye salmon in the UCUSMA during 1995-1999 occurred in these two rivers. The sockeye salmon sport fishery on each of these two rivers have experienced substantial increases within recent years, which correspond to the strong returns of sockeye salmon to the Copper River during the late 1990's (Sharp et al. 2000).

In addition to direct harvests from the recreational fishery, sockeye salmon stocks of the Gulkana and Klutina rivers are subject to harvest from a series of other fisheries that target a mixture of Copper River stocks. Specifically, the Copper River District commercial drift-gillnet fishery and the Chitina and Glennallen Subdistrict subsistence fisheries. The management of these fisheries is based on the abundance of all Copper River drainage stocks, as counted past the Miles Lake sonar station. Under the *Copper River District Salmon Management Plan* (AAC 2002b), the department is directed to manage the commercial fishery to achieve an inriver goal of 15,000 salmon (all species) for sport fishery harvest, 160,000 to 225,000 sockeye salmon (including hatchery stocks) for the subsistence fisheries, 300,000 sockeye salmon for spawning escapement, and a amount determined annually for hatchery brood and surplus stocks. The direct impact from these downstream fisheries on specific stocks of this mixture is unknown.

## **Gulkana River Sockeye Salmon Sport Fishery**

### **Background and Historic Perspective**

The Gulkana River has historically supported the largest sockeye salmon recreational fishery in the UCUSMA (Table 15). The Gulkana River originates in the Alaska Range and flows approximately 126 km south from its headwaters above Summit Lake to its confluence with the Copper River near the community of Gulkana (Figure 7). It is one of few clearwater, non-glacial rivers in the Copper Basin. In addition to the mainstem, this river system also consists of the Middle Fork and the West Fork, both of which join the mainstem from the West. The section of

**Table 15.-Harvest of sockeye salmon by recreational anglers fishing UCUSMA drainages, averaged for 1977 – 1989 and annually from 1990-2001.**

Areas	1977-89	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>d</sup>	1995-1999 <sup>d</sup>
<b>Gulkana River Drainage</b>															
Upper River	661	681	779	805	784	1,055	978	2,593	1,908	2,710	1,846	2,997	524	<b>1,414</b>	<b>2,007</b>
Lower River	156	552	599	255	547	884	920	4,673	2,469	3,460	2,142	1,194	852	<b>1,650</b>	<b>2,733</b>
Gulkana River other <sup>a</sup>	1,369	1,464	988	1,068	1,714	564	511	152	189	200	204	116	432	<b>705</b>	<b>251</b>
<b>Total</b>	<b>2,186<sup>b</sup></b>	<b>2,697</b>	<b>2366</b>	<b>2,128</b>	<b>3,045</b>	<b>2,503</b>	<b>2409</b>	<b>7,418</b>	<b>4,566</b>	<b>6,370</b>	<b>4,192</b>	<b>4,307</b>	<b>1,808</b>	<b>3,769</b>	<b>4,991</b>
<b>Klutina River Drainage</b>															
	950 <sup>b</sup>	802	2,435	1,356	1,369	3,137	2,549	4,215	6,501	4,264	6,514	7,219	5,834	<b>3,314</b>	<b>4,809</b>
<b>Tazlina Drainage</b>															
	17 <sup>b</sup>	0	60	0	9	95	0	25	0	58	30	35	0	<b>28</b>	<b>23</b>
<b>Tonsina Drainage</b>															
	7 <sup>b</sup>	40	200	99	188	66	105	42	39	68	0	0	0	<b>85</b>	<b>51</b>
<b>Copper River</b>															
Upstream of Gulkana	22 <sup>b</sup>	0	0	90	403	37	115	0	0	0	32	141	0	<b>68</b>	<b>29</b>
Downstream of Klutina <sup>c</sup>	56 <sup>b</sup>	30	240	649	0	93	284	17	201	11	65	317	193	<b>159</b>	<b>116</b>
<b>Other Sites</b>															
	715	0	210	238	274	602	606	134	965	413	268	342	334	<b>371</b>	<b>477</b>
<b>Area Total</b>	<b>3,157<sup>b</sup></b>	<b>3,569</b>	<b>5,511</b>	<b>4,560</b>	<b>5,288</b>	<b>6,533</b>	<b>6,068</b>	<b>11,851</b>	<b>12,272</b>	<b>11,184</b>	<b>11,101</b>	<b>12,361</b>	<b>8,169</b>	<b>7,794</b>	<b>10,495</b>

<sup>a</sup> Includes harvests not specified as taken in lower or upper river.

<sup>b</sup> Includes 1983-1988 average harvest only. Prior to 1983, this harvest was included in the listing for “Other waters” in the SWHS report.

<sup>c</sup> Not including Tonsina drainage, but including undesignated Copper River mainstem harvests.

<sup>d</sup> Average value for the years depicted.

the Gulkana River from Paxson Lake downstream to Sourdough is designated by the U.S. Congress as “wild” under the Wild and Scenic Rivers Act of 1968. This section of the river flows through federal lands of the Bureau of Land Management. Much of the land encompassing the remainder of the lower river belongs to the Ahtna Native Corporation. In addition, areas of state and other private ownership are present. Access to the river is available from various secondary roads and trails from the Richardson Highway, which parallels much of the river. Shore angling occurs at each area of access. Anglers also use rafts, canoes, and powerboats to gain access to the more remote sections of the river. Powerboats launch at developed ramps located at Paxson Lake and Sourdough and at an undeveloped site at the Richardson Highway bridge. Raft and canoe anglers frequent the river sections from Paxson Lake downstream to the Richardson Highway bridge. Sockeye salmon are one of various species of the drainage that are targeted by sport fishers. The return to this system is composed of both wild and hatchery stocks. The Gulkana Hatchery has been producing sockeye salmon since the early 1970s and in recent years has produced enhanced returns up to 800,000 adult salmon (Sharp et al. 2000). Sockeye salmon that are surplus to the broodstock requirements of the hatchery are believed to be a substantial component of those harvested in the sport fishery.

The sockeye salmon run timing to this system begins in early June and continues into September. The hatchery enhanced return has a run timing that overlaps the late wild stock component. Beyond basic run timing, life history and stock status information is limited. A weir was operated downstream of the West Fork in 1996 (LaFlamme 1997). Emphasis of the weir project was directed at chinook salmon and the escapement counts provide only a partial count for the season’s sockeye salmon return. An estimated 183,461 sockeye salmon passed the weir from June 11 to July 31. The proportion of the total return that this count represents is unknown, as the weir was operated through only a portion of the sockeye salmon run period. Beginning in 1966, the escapement of sockeye salmon to the Gulkana River has been documented by aerial surveys of index sites to monitor spawner distribution in the drainage (Brady et al. 1991). This aerial survey program was discontinued in 1993; however, a reduced program that will target high priority index sites was reinstated during the 2000 season. The primary source of information regarding the sport fishery is the SWHS (Mills 1979-1994, Howe et al. 1995-2000, Walker et al. *In prep*), which is performed each year with mail out questionnaires. Creel surveys were performed in 1988, 1989, and 1996 (Roth and Delaney 1989, Potterville and Webster 1990, and LaFlamme 1997). As with the weir, these surveys were directed primarily at chinook salmon. The 1988 and 1996 creel surveys did not report sockeye salmon data. The 1989 creel survey did include sockeye salmon, but was limited to the fishery downstream of the West Fork, and estimated a harvest of 327 sockeye (Potterville and Webster 1990). Due to the limited coverage of the creel survey for sockeye salmon, the estimated harvest cannot be compared to the SWHS estimates for 1989.

### **Recent Fishery Performance**

Based on the SWHS, the estimated 2000 sport harvest of sockeye salmon from the Gulkana River was 4,307 fish. The 2000 harvest was 14% higher than the 1990-1999 average and 14% less than the 1995-1999 average. The estimated 2001 sport harvest of sockeye salmon was 1,808 fish. The 2001 harvest was 52% less than the 1990-1999 average and 64% less than the 1995-1999 average. From 1990 to 1999, harvests averaged 3,769 sockeye salmon, annual harvest estimates ranged from 2,128 fish in 1992 to 7,418 fish in 1996 (Table 15). Estimates of the SWHS indicate a trend of increasing harvest, with substantial increases in annual harvests

beginning in 1996. Sport effort in 2000 and 2001 on the Gulkana River drainage were estimated at 25,721 and 24,852 angler days, respectively. Effort in both years was below the 10-year average, 1990-1999, of 33,667 (Table 5). However, due to the nature of the mail survey, it is unknown how much of this effort is directed towards sockeye salmon versus other species. Observations in recent years suggest that most of this effort is directed towards chinook salmon. The harvest declines during 2000-2001 were likely a result of the high water conditions that occurred in the Gulkana River during those years.

### **Management Objectives**

Sockeye salmon fisheries in the Gulkana River are managed to: 1) ensure that the harvests do not threaten the sustained yield; 2) ensure that a diversity of public fishing opportunities and access is maintained; and 3) achieve public benefits from the fishery that outweigh the costs of associated management and research. Escapement objectives for this drainage have not yet been established.

### **Fishery Management**

A management plan is in the process of being completed for the Gulkana River sockeye salmon recreational fishery. Sport fish harvests are monitored with the SWHS. Present sport, commercial, and subsistence harvests are thought to be sustainable. The present management guidelines of the commercial and subsistence fisheries are also thought to provide sustainability of the Gulkana River sockeye salmon stocks. If future estimates indicate significant decreases in abundance or if harvests increase to the point that the ADF&G believes that sustained yields are threatened, then regulatory actions will be considered.

### **Fishery Outlook**

It is anticipated that recent levels of effort and harvests of sockeye salmon in the Gulkana River will continue in the near future. The current regulations appear to be maintaining the stocks at historic levels.

### **Recent Board of Fisheries Actions**

During the December 1999 BOF meeting, only one change regarding sockeye salmon was passed. From August 1 to December 31, the bag and possession limit was increased from 3 to 6 fish on the West Fork of the Gulkana River upstream of a department marker located ½ mile upstream of the confluence with the mainstem. This action was taken to provide additional opportunity to harvest surplus hatchery salmon. A similar proposal has been submitted to the 2002 BOF meeting, requesting that bag and possession limits be increased in the mainstem Gulkana River on July 20 to increase harvest opportunity of hatchery stocks.

### **Current Issues**

Increased use by float and powerboat operators on the Gulkana River is intensifying conflicts between users. The Bureau of Land Management is in the process of updating the management plan for the Wild portion of the Gulkana River upstream of Sourdough.

The majority of lands adjacent to the Gulkana River downstream of Sourdough are owned by the Ahtna Native Corporation. Beginning in the 1991 season, this corporation prohibited trespass across its lands for the purpose of hunting or fishing. In 1999, an access fee was initiated for use of their lands. Many anglers voiced dissatisfaction with the fee and shifted their efforts to the non-fee areas (Richardson Highway bridge and upstream of Sourdough). Ahtna Corporation, in

conjunction with the Department of Transportation, is in the planning phase of the development of a public use area on its lands near the Richardson Highway bridge, a popular fishing and camping site where land ownership is in dispute.

### **Ongoing and Recommended Research and Management Activities**

Sockeye salmon sport fish harvests will continue to be monitored with the SWHS. An aerial survey program was reinstated in 2000 for index escapement estimates on priority spawning areas of the drainage. The present management guidelines of the commercial and subsistence fisheries are also thought to provide sustainability of the Gulkana River sockeye salmon stocks.

The management and research activities associated with the Gulkana River sockeye salmon sport fishery have not been extensive. Given the present lack of information, future research should be directed towards a better understanding of harvest, effort, and fishing patterns, in addition to specific life history of Gulkana River sockeye salmon and migratory timing of wild and hatchery stocks through the lower Gulkana River. There are presently no plans for sockeye salmon research.

### **Klutina River Sockeye Salmon Sport Fishery**

#### **Background and Historical Perspective**

The Klutina River supports one of two major sockeye salmon sport fisheries in the UCUSMA (Figure 2). This semi-glacial river drops rapidly out of Klutina Lake to enter the Copper River near the community of Copper Center. Access to the river is available along the Richardson Highway and from the Klutina Lake road, which parallels the river. The distance between the Klutina Lake Road and the river varies along the course of the road, with the road running along the ridge above the river.

Access to much of the Klutina River is complicated by private land ownership, which encompasses a large portion of the drainage. Much of the land between the road and the river belongs to the Ahtna Native Corporation. The Klutina Lake road is situated on a public access easement, which provides access to state land at the lake, but does not provide direct public access to the river itself. Presently, the Ahtna Native Corporation requires land use permits for river access and camping use of their lands.

The Klutina River provides opportunity for both shore and boat anglers. Shore anglers primarily limited to fishing the lower 1-mile of the river near Copper Center downstream of the Richardson Highway. Jet riverboats are used by experienced operators to access the upstream portions of the river. Launches are available on private land adjacent to the highway and from a site along the new Richardson Highway bridge. The river has considerable stretches of whitewater and is considered to be very challenging to boat operators. The four-wheel drive Klutina Lake road also provides a launch at the lake for whitewater rafters to access the river.

The sockeye salmon run timing to this system begins in mid-June and continues through August. Beyond basic run timing, the life history and stock status information for Klutina River sockeye salmon is very limited. Spawning activity is known to occur in various locations of the river, lake, and tributaries.

The primary source of information regarding the sport fishery is the SWHS (Mills 1979-1994, Howe et al. 1995-2000, Walker et al, *In prep*), which is performed each year with mail out questionnaires. Creel surveys, which emphasized chinook salmon, were conducted in 1988 and

1989 (Roth and Delaney 1989 and Potterville and Webster 1990). Of these, only the 1989 survey provides information related to sockeye salmon, with an estimated catch of 361 (Potterville and Webster 1990). This creel survey was conducted only during the chinook salmon fishery and the estimated harvest is not directly comparable to the SWHS estimate.

### **Recent Fishery Performance**

Based on the SWHS, the estimated 2000 and 2001 sport harvest of sockeye salmon from the Klutina River was 7,219 and 5,834 fish, respectively (Table 15). The 2000 harvest is the largest on record, 118% greater than the 1990-1999 average and 50% greater than the 1995-1999 average. The 2001 harvest is the fourth largest, 76% greater than the 1990-1999 average and 21% greater than the 1995-1999 average. From 1990 to 1999, harvests averaged 3,314, annual harvest estimates during this period, have ranged from 802 fish in 1990 to 6,514 fish in 1999. The SWHS estimates indicate a trend of increasing harvest, with substantial increases in annual harvests beginning in 1996. Sport effort in 2000 and 2001 on the Klutina River drainage was estimated at 11,125 and 8,960 angler days, respectively. The 2000 effort was 6% greater than, while the 2001 effort was 15% below the 10-year average, 1990-1999, of approximately 10,483 angler-days (Table 5). However, due to the nature of the mail survey, it is unknown how much of this effort is directed towards sockeye salmon versus other species. Observations in recent years suggest that most of this effort is directed towards chinook salmon. Why sockeye salmon harvests remained high, while sport fishing effort declined and under high water conditions during 2000 and 2001, may reflect a increased harvest efficiency by sport anglers targeting sockeye salmon.

### **Management Objectives**

Sockeye salmon fisheries in the Klutina River are managed to: 1) ensure that the harvests do not threaten the sustained yield; 2) ensure that a diversity of public fishing opportunities and access is maintained; and, 3) achieve public benefits from the fishery that outweigh the costs of associated management and research.

### **Fishery Management**

A management plan is in the process of being completed for the Klutina River sockeye salmon recreational fishery. Sport fish harvests are monitored with the SWHS. Escapement objectives for this drainage have not been established. Present sport, commercial, and subsistence harvests are thought to be sustainable. The present management guidelines of the commercial and subsistence fisheries are also thought to provide sustainability of the Klutina River sockeye salmon stocks. If future estimates indicate significant decreases in abundance or if harvests increase to the point that the ADF&G believes that sustained yields are threatened, then regulatory actions will be considered.

### **Fishery Outlook**

It is anticipated that effort and harvests of sockeye salmon in the Klutina River will remain at recent levels in the near future. The current regulations appear to be maintaining the stocks at historic levels.

### **Recent Board of Fisheries Actions**

No proposals regarding Klutina River sockeye salmon were submitted to the BOF during the December 1999 meeting or for the 2002 meeting.

## **Current Issues**

The majority of the land adjacent to the Klutina River, upstream of the Richardson Highway, is owned by the Ahtna Native Corporation. Beginning during the 1991 season, this corporation prohibited trespass across its lands for the purpose of hunting or fishing. It has conducted an access fee program since 1998 to allow access to the upper Klutina River. If fees increase without increased access this may result in conflicts between fishery users and the corporation, or increased congestion in areas of the Klutina River that are not corporation lands. Increasing use of the swift Klutina River by powerboats and rafts creates a greater hazard to users. Many sections of the river are not wide enough to allow boats to pass and results in conflicts between the two user groups.

## **Ongoing and Recommended Research and Management Activities**

Sport fish harvests will continue to be monitored with the SWHS. An aerial survey program was reinstated in 2000 for index escapement estimates on priority spawning areas of the drainage. Present sport, commercial, and subsistence harvests are thought to be sustainable. The present management guidelines of the commercial and subsistence fisheries are also thought to provide sustainability of the Klutina River sockeye salmon stocks. If future estimates indicate significant decreases in abundance or if harvests increase to the point that the ADF&G believes that sustained yields are threatened, then regulatory actions will be considered.

Given the present lack of information, future research should be directed towards a better understanding of harvest, effort, and fishing patterns, in addition to specific life history of Klutina River sockeye salmon. A creel survey would be an initial step in providing desired information.

## **COPPER RIVER PERSONAL USE AND SUBSISTENCE SALMON FISHERIES**

### **Background and Historical Perspective**

There is a long history of salmon harvest for consumption as food or use as bait in the Copper River drainage. The Ahtna natives took salmon, mostly chinook and sockeye, with funnel traps and spears in clearwater tributaries. Weirs, gillnets, and dip nets were used in the turbid mainstem Copper River and at its delta. Haley Creek was the site of one of the many traditional fishing camps along the Copper River. With anglo settlement, fishwheels were introduced to the Copper River. By 1920, fishwheels and dip nets took over as the means of capturing salmon for personal needs in this river. Also, the popularity of the fishery increased substantially with the introduction of this gear.

Historically, the taking of salmon for consumption as food or use as bait in the Copper River drainage was governed under subsistence regulations. In 1978, Alaska passed its first subsistence law. This legislation guaranteed the "customary and traditional use" of fish and game harvest in Alaska and gave this harvest a priority in terms of allocation. Under this law, the Board of Fisheries adopted the *Copper River Subsistence Salmon Fisheries Management Plan* (AAC 2002d). This management plan established seasons, open areas, legal gears, permit requirements, and bag limits for a subsistence salmon fishery in the Copper River. The plan also directed the department to manage the Copper River commercial salmon fishery to ensure that an adequate escapement reaches the spawning areas and to provide for subsistence harvest.

In 1980, with the passage of the Alaska National Interest Lands Conservation Act (ANILCA), the federal government mandated subsistence hunting and fishing preference for "rural" residents

on federal lands. Subsequent rulings by the federal government stated that if the state failed to meet this requirement, the federal government would take over management of fish and game on all federal lands. To comply with this requirement and prevent federal takeover, the joint Boards of Fish and Game adopted a regulation in 1982 stating that only "rural" residents had "customary and traditional use" of fish and game and established eight criteria for identifying "customary and traditional uses." Under this plan, subsistence fishers were given one of four classes of permits depending upon their locality to the fishery, income, age, and past use. During times of low escapement, Copper River basin residents received priority over non-basin residents. Due to growth in the fishery, the board eliminated non-basin residents from the Copper River subsistence fishery based on analyses of the eight-point criteria in 1984.

This decision precluded many individuals from participating in the Copper River subsistence fisheries, thereby precluding them from harvesting fish for their personal use. This led the Board of Fisheries to establish a new category of fisheries, personal use fisheries in 1982 (AAC 2002f). These fisheries were created to provide Alaskans who became ineligible to harvest fish under new subsistence regulations the opportunity to harvest fish for consumption as food or use as bait. Personal use fisheries, like commercial and sport fisheries, were not given a "priority" in terms of allocation as were subsistence fisheries. In 1984 the Board of Fisheries created a personal use salmon fishery in the Copper River drainage under the *Copper River Personal Use Dip Net Salmon Fishery Management Plan* (AAC 1999).

Personal use fisheries differ from sport fisheries in both their objective and management. Both fisheries provide Alaskans the opportunity to harvest fish for personal consumption (in either fishery fish cannot be sold or bartered), but personal use fisheries are managed to maximize harvest potential whereby sport fisheries are managed to provide diversity of opportunity and to maximize economic benefit to Alaska. Also, whereas anyone can participate in Alaska's sport fisheries (provided they have a license), only Alaska *residents* may participate in personal use fisheries. The Division of Sport Fish managed the personal use fishery, while the Division of Commercial Fisheries managed the subsistence fishery.

Both the subsistence and personal use salmon fisheries in the Copper River drainage have undergone changes since their inception. Currently, all Alaskans are eligible to participate in the subsistence fishery based on the McDowell decision in 1989. The Glennallen Subdistrict Subsistence Salmon fishery occurs upstream of the Chitina-McCarthy bridge to Slana and can be prosecuted with fishwheels and dip nets. The season is from June 1 through September 30, unless closed by emergency order. Only Alaska residents can participate in this subsistence fishery. A special permit, which is free, is required to participate in the fishery. The permit can only be obtained at Fish and Game offices in Anchorage, Delta Junction, Fairbanks, Glennallen, Palmer, or Tok, and at the National Park Service office in Slana and Chitina. Anglers must record their harvest on their permit and return the permit upon completing fishing. The limits are 30 salmon for a household of one, 60 salmon for a household of two, and 10 salmon for each additional person in a household of more than two people. Individuals may request additional salmon up to a maximum of 200 salmon and households may request up to 500 salmon. For people using dip nets, only 5 of the salmon may be chinook salmon. There is also a requirement that all anglers, upon landing a salmon while subsistence fishing, must immediately remove both tips of the tail from the salmon. A subsistence fishery is also allowed in a portion of Tanada Creek, near the traditional Native fishing site of Batzelnetas, with spears and dip nets.



During the 1999 BOF meeting, the board ruled in favor of a positive customary and traditional use finding for the salmon stocks of the Chitina Subdistrict of the upper Copper River. This resulted in the Chitina Subdistrict Personal Use Salmon fishery changing to the Chitina Subdistrict Subsistence Salmon fishery. Further details of this action will be discussed later in this section. As is the case for the Glennallen Subdistrict Subsistence Salmon fishery, only Alaska residents may participate in the Chitina Subdistrict Subsistence Salmon fishery. This fishery was opened by emergency order. Both a valid Alaska sport fishing license and a special permit are required to participate in the personal use fishery. The permit costs \$10 and can be obtained at the Fish and Game offices in Chitina, Fairbanks and Glennallen (the fee was increased to \$25 in 2000 and permits were issued from Fish and Game offices in Anchorage, Palmer and Delta Junction as well). Since 2001, participants were able to obtain their Chitina Subdistrict Subsistence Salmon fishery permits from over 40 licensed vendors located in the Southcentral and Interior regions. Anglers must record their harvest on their permit and return the permit upon completing fishing. The limits are 15 salmon for a single person and 30 salmon for a household of two or more, only one of which may be chinook salmon. Only dip nets may be used to harvest salmon. The entire mainstem Copper River between the downstream edge of the Chitina-McCarthy bridge and a department marker located about 200 yards upstream of Haley Creek (in Wood Canyon) is open to personal use fishing. The Board has mandated that Alaskans can participate in either the subsistence or personal use fishery in the Copper River drainage, but not both.

The Board of Fisheries has authorized the department to manage the commercial salmon fishery to provide the following inriver goal of salmon, measured at the Miles Lake Sonar (in AAC 2002b):

Spawning escapement (sockeye salmon)	300,000
Spawning escapement (other salmon)	17,500
Glennallen Subdistrict Subsistence harvest (salmon)	60,000 – 75,000
Chitina Subdistrict Subsistence harvest (salmon)	100,000-150,000
Sport fishery harvest (salmon)	15,000
Hatchery brood stock (sockeye salmon)	Estimated annually
Hatchery surplus (sockeye salmon)	Estimated annually
TOTAL	Announced annually

The subsistence guideline is adjusted annually in order to accommodate the anticipated subsistence harvest. The hatchery brood stock and hatchery surplus are also adjusted annually based on the anticipated return of wild and hatchery stocks.

From 1997-1999, the maximum harvest for the personal use fishery was 100,000 salmon, excluding fish provided in excess of the inriver goal and not including any salmon harvested after August 31. Prior to 1997, this amount was 60,000 salmon. When an escapement greater or less than the inriver goal actually pass the sonar counter, the board has remanded the department increase or decrease the fishing times by the corresponding percentage. Since 2000, as a subsistence fishery, the Chitina Subdistrict has a harvest range of 100,000-150,000 salmon, of which 85,000-130,000 are wild salmon. Since 1997, the harvest range for the Glennallen Subdistrict has been 60,000-75,000 salmon. Prior to 1997, this amount was 35,000 salmon.

Harvests by the subsistence fishery have been estimated since 1965. From 1977 through 1989, harvests in the Glennallen Subdistrict Subsistence Salmon fishery averaged 48,202 salmon (Table 16). The fishery experienced rapid growth from 1980 through 1983, when a peak harvest of about 119,000 salmon were taken. Under the subsistence fishery management plan, harvests decreased substantially in 1984 to about 29,000 salmon. Since 1984, subsistence harvests have gradually increased, with the 2000 permits and 1997 harvest of 1,253 and 85,578, respectively, the highest since 1983 (Figure 11). The percentage of non-Copper River basin participants has increased from less than 20% prior to 1991 to an average of 57% from 1991-1999. This increase can be attributed to those participants from Anchorage (24%), Fairbanks (7%) and Mat-Su Borough (10%) communities that entered the fishery following the McDowell decision. Concern has been expressed regarding significant under-reporting of salmon harvest in this fishery, especially over the past decade. Trends in the number of permits issued to participate in this fishery closely resemble harvest trends (Table 16).

Harvests in the Chitina Subdistrict fishery have been estimated since establishment in 1984 (Table 17). From 1984 through 1988, harvests remained relatively stable, averaging about 47,000 salmon annually. After 1988, harvests in the personal use fishery increased annually until 1998 (Figure 12). Trends in the number of permits issued to participate in this fishery closely resemble harvest trends (Table 17).

Harvests in both subsistence fisheries are dominated by sockeye salmon (Table 2). Chinook salmon comprise the second largest harvest, while a nominal coho harvest also occurs.

### **Recent Fishery Performance**

The number of permits issued and salmon harvests in both subsistence fisheries has increased in recent years. In 2000 and 2001, the Glennallen Subdistrict subsistence fishery participation exceeded 1,200 permits issued in both years and harvests were the sixth and highest since 1983 with 64,885 and 88,578 salmon, respectively (Table 16). The number of permits issued in 2002 was 1,122 with the harvest of an estimated 59,000 salmon, below the anticipated subsistence harvest range (60,000 – 75,000 salmon). As this estimate is based upon only 53% of the permits returned at this time, it is anticipated that the final harvest will be within the harvest range. In 2000 and 2001, the Chitina Subdistrict subsistence fishery participation was 8,151 and 9,463 permits issued and total harvests were 114,681 and 138,425 salmon, respectively (Table 17). In 2002, 6,091 Chitina Subdistrict subsistence fishery permits were issued and an estimated 57,000 salmon harvested. The Chitina Subdistrict estimate is based upon only 33% of permits returned, and due to permits being issued at vendors, not all permits issued have been returned at this time.

**Table 16.-Number of permits issued and salmon harvests during the Glennallen Subdistrict subsistence salmon fishery in the Copper River, 1977-2002.**

Year	Number Permits Issued	Estimated Salmon Harvest			
		Chinook	Sockeye	Coho	Total <sup>b,c</sup>
1977	4,066	2,555	41,978	523	45,208
1978	3,705	2,239	25,783	675	28,715
1979	3,200	3,416	33,096	928	37,585
1980	3,203	3,035	31,041	822	35,100
1981	4,078	2,410	65,168	1,077	68,687
1982	6,090	2,764	105,432	1,361	109,726
1983	7,541	5,950	110,794	1,855	118,734
1984	475	509	27,941	167	28,631
1985	- <sup>a</sup>	629	30,666	294	31,614
1986	405	686	27,441	291	28,423
1987	445	813	33,106	161	34,142
1988	417	992	29,194	372	30,755
1989	386	787	28,360	69	29,308
1990	406	647	31,765	92	32,524
1991	712	1,328	39,599	232	41,205
1992	655	1,449	45,232	350	47,095
1993	773	1,434	53,252	77	54,854
1994	970	1,989	68,278	60	70,391
1995	858	1,892	52,516	882	55,323
1996	850	1,482	52,052	557	54,290
1997	1,133	2,583	82,807	187	85,744
1998	1,010	1,842	64,463	533	66,951
1999	1,102	3,278	77,369	1,121	82,119
2000	1,253	4,856	59,497	532	64,885
2001	1,239	3,553	83,787	1,154	88,578
2002 <sup>d</sup>	1,122	3,823	54,606	543	59,002
<b>1977-1989</b>	<b>2,834</b>	<b>2,060</b>	<b>45,385</b>	<b>661</b>	<b>48,202</b>
<b>1990-1999</b>	<b>847</b>	<b>1,792</b>	<b>56,733</b>	<b>409</b>	<b>59,050</b>
<b>1995-1999</b>	<b>991</b>	<b>2,215</b>	<b>65,841</b>	<b>656</b>	<b>68,885</b>

<sup>a</sup> Data not available.

<sup>b</sup> Total harvest includes steelhead and other species.

<sup>c</sup> Total harvest prior to 1984 includes both harvest from the Chitina and Glennallen subdistricts.

<sup>d</sup> Preliminary estimate with only 53% of permits returned.

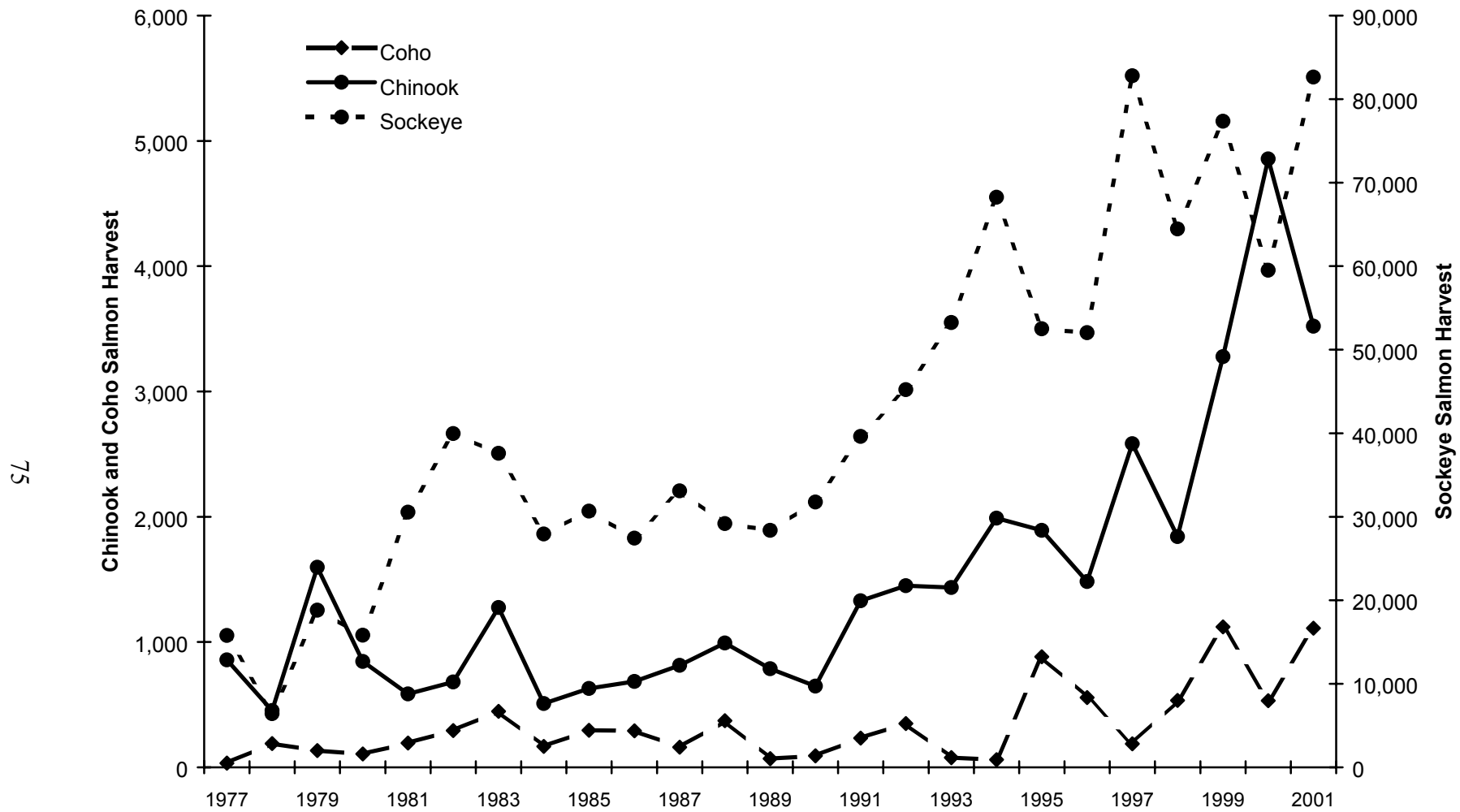


Figure 11.-Copper River Glennallen Subdistrict subsistence harvest by species, 1977-2001.

**Table 17.-Number of permits issued and salmon harvested during the Chitina Subdistrict subsistence salmon fishery in the Copper River, 1984-2002.<sup>a</sup>**

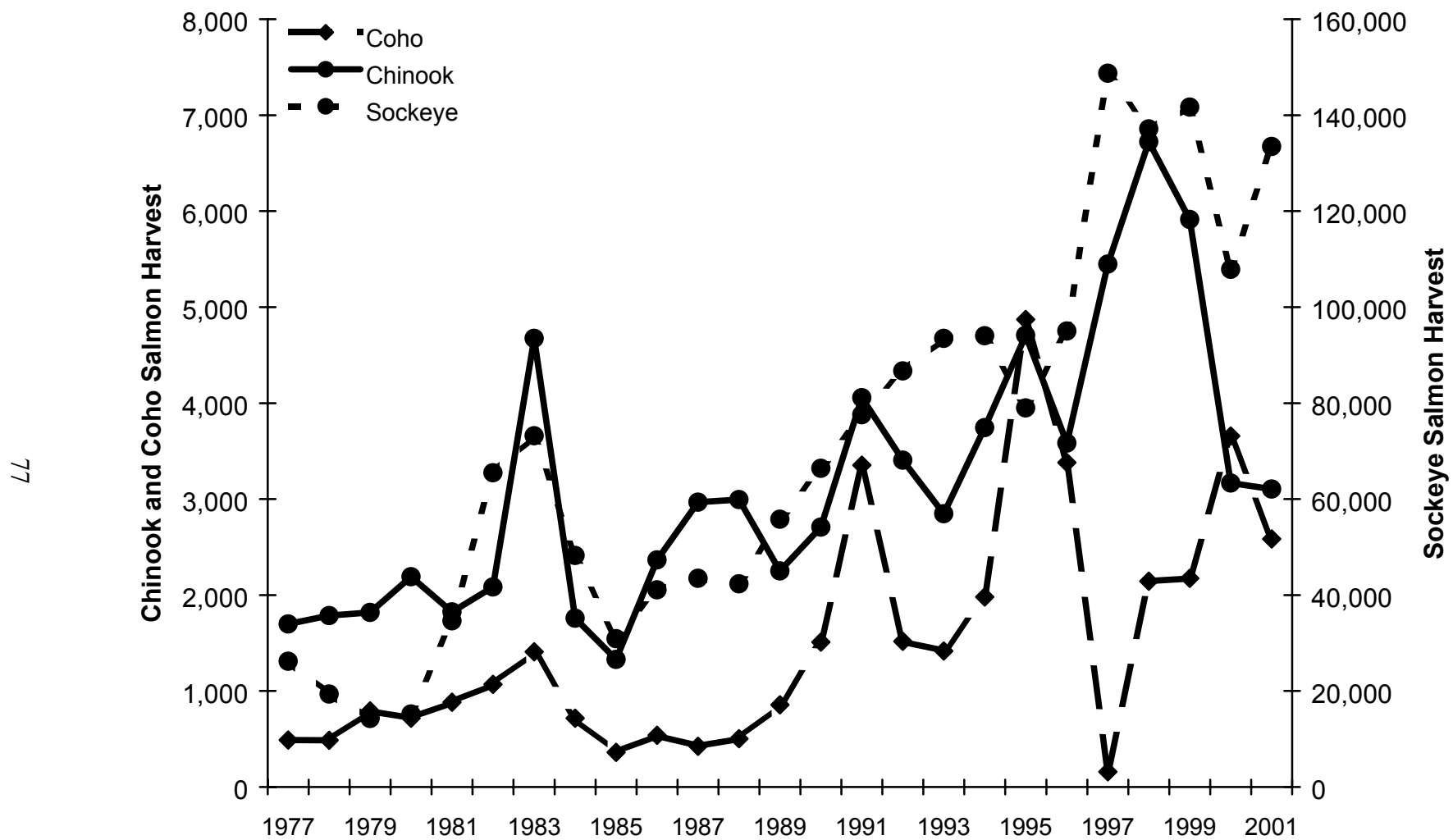
Year	Number Permits Issued	Estimated Salmon Harvest			
		Chinook	Sockeye	Coho	Total <sup>d</sup>
1984	5,415	1,760	48,236	717	50,734
1985	--- <sup>b</sup>	1,329	30,885	361	32,586
1986	4,031	2,367	41,054	538	44,047
1987	4,245	2,968	43,492	424	46,908
1988	4,251	2,994	42,331	504	45,855
1989	4,582	2,251	55,778	857	58,941
1990	5,689	2,708	66,432	1,511	70,812
1991	6,222	4,056	77,590	3,354	85,059
1992	6,385	3,405	86,724	1,517	91,683
1993	7,914	2,846	93,472	1,416	97,767
1994	7,061	3,743	94,024	1,981	99,822
1995	6,760	4,707	79,006	4,870	88,617
1996	7,198	3,584	95,007	3,381	102,108
1997	9,086	5,447	148,727	160	154,349
1998	10,006	6,723	137,161	2,145	146,075
1999	9,943	5,913	141,658	2,174	149,779
2000	8,151	3,168	107,856	3,657	114,681
2001	9,463	3,113	132,108	2,720	138,425
2002 <sup>c</sup>	6,091	1,446	54,645	1,161	57,470
<b>1990-1999</b>	<b>7,090</b>	<b>4,313</b>	<b>101,980</b>	<b>2,251</b>	<b>108,607</b>
<b>1995-1999</b>	<b>8,022</b>	<b>5,275</b>	<b>120,312</b>	<b>2,546</b>	<b>128,186</b>

<sup>a</sup> From 1984 to 1999 the Chitina Subdistrict was classified a personal use fishery.

<sup>b</sup> Data not available.

<sup>c</sup> Preliminary estimates with only 33% of permits returned.

<sup>d</sup> Total estimate includes unidentified salmon.



**Figure 12.-Copper River Chitina Subdistrict harvest by species, 1977-2001.**

It is anticipated that participation will be between 7,000 and 8,000 permit holders and harvests will reach 100,000 salmon. Participation declined in the Chitina Subdistrict from the fishery high of 10,006 permits in 1998. The decline in 2000 is believed to be partly responsible due to the reduction in the chinook salmon limit from 4 to 1 and the permit fee increase from \$10 to \$25 that were both instituted in 2000. An increase of approximately 150 permits occurred in the Glennallen Subdistrict in 2000, which may have been a shift of previous Chitina Subdistrict permits holders to the Glennallen Subdistrict.

In 1999, Federal management of the Copper River subsistence fisheries was initiated, but as Federal and State regulations were identical, both Federal and State subsistence users participated in the fisheries under the State subsistence permit. In 2001, as a result of Federal Subsistence Board (FSB) actions, Federally qualified subsistence users were able to begin fishing on May 15 in the Glennallen Subdistrict, as Federal subsistence limits remained identical to State limits, Federal subsistence users still fished under State subsistence permits. In 2002, the FSB established a Federal Subsistence fishery in the Chitina Subdistrict with a cumulative limit of 200 salmon for a household of one and 500 salmon for a household of two or more for both the Chitina and Glennallen subdistricts. Federal subsistence users are able to participate in both fisheries, while State subsistence users must select either the Chitina Subdistrict or Glennallen Subdistrict in which to participate. As a result, the National Park Service issued separate Federal subsistence fishing permits to Federal subsistence users in 2002. In 2002, 209 Glennallen Subdistrict and 123 Chitina Subdistrict permits were issued to Federal subsistence users. The decline in State Glennallen Subdistrict subsistence permits is likely a result of Federal subsistence users receiving Federal permits. Approximately 400 permit holders in 2001 were Federally qualified, so only a portion of those users chose to get Federal subsistence permits in 2002.

### **Management Objectives**

Both fisheries are managed under a Board of Fisheries adopted management plan, the *Copper River Subsistence Salmon Management Plan* (AAC 2002d). The plan stipulates management objectives and guidelines, with allocations for each fishery outlined in the *Copper River District Salmon Management Plan* (AAC 2002b).

The inseason management of the Chitina Subdistrict Subsistence Salmon fishery follows the objectives and guidelines in the *Copper River Subsistence Salmon Management Plan* (AAC 2002d). Prior to 1996, under the *Copper River Personal Use Salmon Management Plan* (AAC 1996), the BOF established weekly harvest quotas and also allocated 25% of any escapement in excess of the optimum escapement goal of 560,000 to the Chitina Subdistrict personal use fishery. The weekly fishing periods and limits established by emergency order are based on the projected inriver returns. Inriver returns are estimated by sonar located at Miles Lake. The management plan was revised during the 1996 BOF meeting such that the harvest will be distributed throughout the season, based upon on the projected sonar counts. Adjustments will be made to the preseason schedule based on the actual sonar counts, by increasing or decreasing fishing time. At the 1999 meeting, the department requested the BOF to adopt the existing personal use management plan guidelines for the reclassified Chitina Subdistrict Subsistence fishery.

### **Fishery Management**

In 2000, the Chitina Subdistrict Subsistence Fishery season was opened by emergency order on June 10 for a 12-hour fishing period (Table 6). The *Copper River Subsistence Salmon Fisheries*

*Management Plans* requires that the fishery be opened between June 1 – 11. Actual salmon numbers past the Miles Lake sonar during the week of May 16-21 were lagging projected counts by over 3,000 fish. This resulted in no fishing time during the first allowable fishing period of June 1 – 4. The second fishing period (June 5 – 11) was reduced from 36 to 12 hours due to a 23,000 fish deficit at the sonar from May 22 – 28. Salmon numbers past the sonar from May 29 – June 4 were above the projected salmon counts for this period by 3,600 fish, and the third fishing period (June 12-18) remained at 80 hours. The fourth period (June 19-25) was reduced from 132 to 80 hours based upon actual sonar counts lagging projected sonar counts by 39,000 fish. Actual sonar counts continued to lag behind projected sonar counts and the fifth period was reduced from 136 hours to 112. The following week projected counts were surpassed in excess of 50,000 salmon and the fishery was opened continuous and a supplemental period occurred during the sixth period. The fishery remained open through September 30, sonar counts remained at or below projected numbers and no other supplemental periods occurred.

The 2001 Copper River Chitina Subdistrict subsistence fishery opened by emergency order for a 156 hour opening on June 4 at 8:00 A.M. (Table 7). Based on numbers of fish passing the Miles Lake sonar (50,000 surplus to the weekly escapement goal) this first period was a supplemental period. The fishery re-opened June 11 for a 168 hour opening. Due to another week of 50,000 salmon surplus, this second period was also a supplemental period. The fishery remained open the following week (June 18) due to sonar counts, which remained near escapement objectives. Sonar counts declined slightly and the fourth period was reduced to 132 hours, opening on June 26. The fishing period during the week of July 2 was divided into two fishing periods to coincide with the 4<sup>th</sup> of July holiday, due to sonar numbers remaining slightly below anticipated, continuous fishing was not permitted. The following week, sonar counts improved and the fishery opened to continuous fishing on July 9 and remained open through September 30.

The 2002 Copper River Chitina Subdistrict subsistence fishery opened by emergency order for a 32 hour opening on June 8 at 8:00 AM. (Table 8). The fishery re-opened June 10 for a 156 hour opening. The fishery remained open (168 hours) the following week (June 17) as actual sonar counts exceeded escapement objectives by 22,000. Sonar counts declined and the fourth period was reduced to 120 hours, opening on June 26. Sonar numbers remained below anticipated numbers and the fifth period was reduced to 84 hours over the 4<sup>th</sup> of July weekend. The following week, sonar counts improved and the fishery hours increased to 112 hours, opening on July 10. Sonar numbers improved the next week and the fishery opened to continuous fishing on July 15 and remained open through September 30. Based on numbers of fish passing the Miles Lake sonar (50,000 surplus to the weekly escapement goal) the period during the week of July 29 – August 4 was a supplemental period.

Beginning in 2000, Chitina Subdistrict permits were available from ADF&G offices in Anchorage, Fairbanks, Glennallen, and Palmer to provide additional service to the dipnetting public, reduce fishery operating costs, and prevent excessive delays (up to 3 hours) at the Chitina ADF&G office for participants to receive permits. In 2001, permit issuance was expanded to over 40 license vendors in the Southcentral and Interior regions. This prevented any inseason estimation of weekly harvest and participation since 2000, but lack of this information did not influence management decisions during this time.

### **Fishery Outlook**

In recent years, the participation in the Chitina Subdistrict had leveled off at about 10,000. The changes in the Chitina Subdistrict fishery in 2000 have resulted in a slight decline in



participation in the Chitina Subdistrict, but an increase in the Glennallen Subdistrict. The Federal subsistence fishery has caused a slight decline in Glennallen Subdistrict permits, but based upon combined State and Federal permits, participation in the fishery has actually increased. During July 2001, a landslide downstream of O'Brien Creek (approximately in the middle of the Chitina Subdistrict) block road access to the lower half of the fishery. In 2002, the landslide had not been cleared and the road was blocked during the entire season. The Department of Transportation has received bids for clearing the slide and stabilizing the road, but the costs were higher than anticipated and the decision to fund this work has not been made. The restricted access may have been partially responsible for the decline in Chitina Subdistrict permits in 2002.

A bill was introduced to the 2001/2002 legislature to removed the permit fee from regulation, but the bill died in committee at the end of the session. It is believed another bill to remove the fee will be submitted this session. Dependent on legislative action and the new State administration the status of the \$25 permit fee for 2003 is uncertain. DNR and ADFG have been directed by the legislature to resolve the access issue in the Chitina Subdistrict fishery and contract negotiations with Ahtna and Chitina Native Corporations have been initiated, though no agreements have been reached. It is anticipated that participation in the Chitina Subdistrict fishery will continue at the reduced level if salmon returns, access fees, and fishery management remain similar to 2000. If the fee is removed, the number of permits issued will undoubtedly increase, but whether all permit holders will participate is questionable. If a high proportion of permits do not participate and do not return permits as a result, the impact on harvest estimation would be negative, as precision would decline.

Harvests of sockeye salmon will be dependent upon salmon run strength, if the harvest range for the Chitina Subdistrict subsistence fishery is increased and escapement objectives are met, the fishery will likely have a greater period of time open to continuous fishing. There have been observations that many participants in the Cook Inlet personal use fishery also participate in the Copper River personal use fishery. Cook Inlet permits have been returned to the Chitina and Glennallen offices in past years. If the Cook Inlet fishery is poor, then there is potential for an increase of participation in the Copper River fishery from the Cook Inlet users.

### **Recent Board of Fisheries Actions**

Due to changes in the distribution of fishing effort since the inception of the plan in 1984, a revised management plan was developed during the 1996 BOF meeting. The revised plan distributes the personal use harvest throughout the season based upon the daily projected sonar counts at the Miles Lake sonar. The maximum harvest level was increased from 60,000 to 100,000 salmon, not including any salmon in excess of the inriver goal or salmon taken after August 31. During the December 1997 BOF meeting an agenda change request was addressed by the board that would allow personal use permit holders to harvest additional fish in years of surplus escapement. A decision on this proposal was deferred until the February 1998 meeting to allow the advisory committee to review and comment on the amended proposal. At the February meeting, the BOF passed the proposal that allows personal use permit holders, who have filled their original limit, to be issued a supplemental permit for 10 additional fish in weeks when a harvestable surplus of 50,000 salmon or greater will be available in the Chitina Subdistrict.

Actual harvest numbers resulting from the issuance of supplement permits have been relatively low. The supplemental period is also a likely attractant to participants who anticipate high catch

rates owing to the escapement surplus; the potential increased effort and catch however, are currently immeasurable.

The “insurance policy” in the *Copper River Chinook Salmon Plan* resulted in a reduction of chinook bag limit from five to four salmon. Chinook harvests continue to increase following this bag limit reduction with record harvests of chinook from 1997 to 1999. This plan has been relatively ineffective in reducing chinook harvest due to increased participation in the fishery. Only 7,198 permits were issued in 1996, but from 1997-2000, in excess of 9,000 permits have been issued each year. The increased participation is likely one of the reasons the chinook harvests did not decline.

During the 1999 BOF meeting, the board ruled in favor of a positive customary and traditional use finding for the salmon stocks of the Chitina Subdistrict of the upper Copper River. As a result of this decision, the Copper River Personal Use Salmon Dipnet Fishery was repealed and a Chitina Subdistrict subsistence fishery was established. The regulations for the Chitina Subdistrict subsistence fishery remained similar to the Copper River Personal Use Salmon Dipnet Fishery regulations with three exceptions. The three exceptions included an adjustment to the annual bag limit, a maximum harvest level of wild stock sockeye salmon of 85,000 – 130,000, and permit holders are no longer required to possess a sport fishing license. Annual bag limits will continued to be 30 salmon for a household of two or more, and 15 salmon for a household of one, of which only one fish can be a chinook salmon. The Board of Fisheries determined that reducing the bag limit of chinook salmon from four in the personal use fishery to one in the subsistence fishery, provided for a reasonable opportunity to harvest a chinook salmon, but would also maintain chinook salmon harvests at historic levels. Based upon recent harvests the board determined that 100,000 – 150,000 salmon were necessary for subsistence needs to be met for the Chitina Subdistrict fishery. This number included contributions of hatchery fish, and after this contribution was subtracted, resulted in the 85,000 – 130,000 wild stock harvest level. As a result of this determination, there were two subsistence fisheries in the upper Copper River district as of 2000. The chinook harvests since 2000 have declined to approximately 3,000 salmon annually, which is in line with historic levels.

### **Current Issues**

As a result of the 1999 BOF action, the issue regarding allocations for the Chitina Subdistrict do not exist, as a subsistence fishery harvest increases, the BOF can adjust the amount set to meet subsistence needs in the *Copper River District Salmon Management Plan*. Following the 1999 meeting, members of the Copper River Native Association, Chitina and Ahtna Native corporations filed a petition to the board to reconsider the subsistence ruling. The BOF agreed to have a committee meet in March 2000 to listen to information regarding the Chitina Subdistrict ruling. Following the March meeting, the committee presented it’s findings and recommendation to the BOF, which decided to not reconsider the ruling, since no new or compelling information was presented to the committee that would indicate a need to revisit the 1999 decision. There is still some resentment among the Native community towards urban participants in the Chitina Subdistrict regarding the subsistence classification. There are two proposal submitted to the BOF for the 2002 meeting requesting reconsideration of the 1999 ruling.

At the 2000 BOF meeting a proposal was submitted to allow 100,000 salmon past the sonar before the commercial fishery could begin fishing. This proposal was submitted as an Agenda Change Request under a conservation issue regarding early return sockeye salmon. The BOF voted against the proposal, but additional concerns voiced by the proposal author regarding

subsistence needs of the Chitina Subdistrict dipnetters not being met may be an ongoing issue. Issues for the Chitina Subdistrict are likely to include, uninterrupted fishing time and increased chinook and sockeye bag limits. Now that two subsistence fisheries exist, any disparity in regulations between the two fisheries is likely to become an issue. Several proposals have been submitted regarding increasing Chitina Subdistrict fishing time and limits.

The Chitina Village Council initiated a personal use chinook salmon derby in 1999. This derby did not begin until the fourth week of the fishery, after the majority of chinook had passed the fishery and did not result in an increase harvest of chinook. There has been no derby sponsored by the Chitina Village Council since 1999. There are potential concerns regarding a subsistence fishery involved with a salmon derby, if future derbies are scheduled.

Another issue regarding this fishery relates to access. Much of the land in the area open to subsistence and personal use fishing is privately owned. In 1985 and 1986, the Chitina Native Corporation blocked the road to O'Brien Creek and charged a fee for access. In 1987 the state of Alaska negotiated a \$15,000 contract with the Chitina Native Corporation for access and to build and maintain outhouses and collect and remove garbage. The contract was renewed in 1988. The legislature refused to appropriate funds for access in 1989 after roadwork done on the road in the fall of 1988 eliminated areas where the road passed on private land. In response, the Chitina Native Corporation refused dipnetters access to O'Brien Creek during the 1989 season. The legislature again appropriated funds for access to O'Brien Creek in 1991. Also in 1991, at the urging of the Chitina Dipnetter's Association, the legislature instituted a \$10 fee for the personal use fishery. The fee was to be used to develop a long-term lease. During 1994, a 5-year lease was negotiated with the Chitina Corporation. In 1995, a 4-year lease was negotiated with Ahtna Corporation for use of lands surrounding Haley Creek. Trespass on lands not included in the lease agreement remains an issue. During work group meetings in the fall and winter of 1995-1996, Native groups from the Chitina area expressed discontent with the adequacy of the negotiated leases. The lease agreements both expired December 31, 1998. Meetings with both corporations occurred during 1998 and 1999 and resulted in a one-year extension of the existing contract and monthly meetings throughout the fishing season in 1999 to address current issues. These meetings have provided input for developing the new contracts and addressing issues in the previous contracts. Primary concerns from the corporations include operation of the commercial charter operators at O'Brien Creek, trespass on both east and west banks of Copper River where access was not provided by contract, and lack of enforcement for fishing and trespass violations. Negotiations for a new one-year contract were completed in early 2000. As a result the access fee was increased to \$25 for the 2000 season. This contract has been renewed annually through 2002. Contract negotiations for 2003 with Ahtna and Chitina Native Corporations have been initiated, but as mentioned earlier legislative and administrative action may complicate the process.

On October 1, 1999 the Federal government assumed management responsibilities for subsistence fisheries on all non-navigable waters on public lands and navigable and non-navigable waters within and/or adjacent to the boundaries of the wild-designated portion of the Gulkana River, and Wrangell-St. Elias National Park. This includes the waters of the upper Copper River District. The Federal Register adopted the state regulations, but accepted proposals for changes to these regulations in 2000 and 2001. The Federal Subsistence Board voted on these proposals and the three proposals that passed have direct implications with the upper Copper River District. These include: the modification of the subsistence fishery at

Batzulnetas to conform with the regulations stipulated in a federal court injunction; a positive customary and traditional use finding and fishing season for the Chitina Subdistrict, and a season extension to the Glennallen Subdistrict fishery. As the federal and state regulations continue to diverge there is potential for conflicts between state (all Alaska residents) and federally qualified (rural residents) subsistence users, as the federal regulations are less restrictive. This has occurred between federal subsistence and state sport hunting, which has resulted in more restrictive state management as the federal hunts are liberalized. As a result of Federal management, no State Batzulnetas permits have been issued since 1999, participants in this fishery have participated under Federal permits.

The permitting process for the Chitina Subdistrict was changed in the 2000 season. Permit holders are no longer required to return permits at the end of each fishing trip. This has resulted in a lower percentage of returns and less timely harvest information. In addition, the question regarding quality of reporting data, based upon the memory of participants remembering the date and harvest from six months prior. This could potentially bias abundance estimates of chinook salmon, based upon capture of chinook in the Chitina Subdistrict, if the estimates must be stratified by date. This also impacts calculation of hatchery salmon contribution to the fishery, as these estimates are based upon daily harvest in the fishery.

### **Ongoing and Recommended Research and Management**

At present, the Division of Sport Fish conducts a program to issue permits, monitor the fishery, and estimate harvests for both upper Copper River District salmon fisheries. During 1995, a program was initiated to estimate the proportion and timing of sockeye salmon produced by the Gulkana Hatchery from coded wire tag (CWT) recoveries in the personal use fishery. In time, this will allow managers to better target hatchery stocks while protecting wild fish. The chinook radio-telemetry study initiated by the department since 1999 has provided information regarding chinook passage through the fishery.

Continued refinement of the criteria for opening and closing the Chitina Subdistrict fishery is needed. The relationship between the sonar count and fish passage rate through the fishing area is poorly understood. Comparison of sonar counts to harvest rates was attempted with poor success. Time series analysis of the factors affecting fish passage is necessary. Difficulties in shifting effort from the early sockeye stocks continue and results in less fishing time in the early portion of the season as participation increases.

Annual review of the permitting process should be continued to insure quality harvest data that is cost effective.

### **ARCTIC GRAYLING SPORT FISHERIES**

From 1977 through 1995, more grayling were harvested and caught by sport anglers fishing UCUSMA waters than any other fish (Tables 6 and 7). Harvests remained relatively stable from 1977 through 1987, averaging about 28,982 grayling. Since 1988, however, harvests have been lower, with the 2001 harvest of 4,450 grayling being the lowest on record (Table 18, Figure 13). This has been primarily the result of more restrictive regulations adopted to assure the sustained yield of the area's grayling stocks. The 2000 harvest accounted for about 30% and 23% of the AYK and statewide harvest of grayling, respectively. The 2001 harvest accounted for about 24% and 17% of the AYK and statewide harvest of grayling, respectively.

The largest grayling fishery in the UCUSMA has historically occurred in the Gulkana River drainage (Table 19). From 1990 through 1999, this drainage accounted for about 35% of the

**Table 18.-Harvest of Arctic grayling by recreational anglers fishing UCUSMA waters, averaged for 1977 – 1989 and annually from 1990 to 2001.**

Year	UCUS Harvest	Alaska Harvest	Percent	Region III Harvest	Percent
1977-1989 <sup>a</sup>	27,490	141,146	20	113,973	24
1990	13,775	64,814	21	51,281	27
1991	13,278	82,831	16	65,632	20
1992	11,125	45,073	25	33,429	33
1993	12,504	49,740	25	38,363	33
1994	14,066	63,443	22	47,183	30
1995	14,289	46,168	31	37,574	38
1996	10,534	46,943	22	35,525	30
1997	8,583	45,844	19	33,968	25
1998	8,275	38,445	22	30,611	27
1999	8,245	37,252	22	28,275	29
2000	6,590	28,769	23	22,138	30
2001	4,450	25,656	17	18,608	24
<b>1990-1999<sup>a</sup></b>	<b>11,467</b>	<b>52,039</b>	<b>23</b>	<b>40,184</b>	<b>29</b>
<b>1995-1999<sup>a</sup></b>	<b>9,985</b>	<b>42,930</b>	<b>23</b>	<b>33,191</b>	<b>30</b>

<sup>a</sup> Average value for the years depicted.

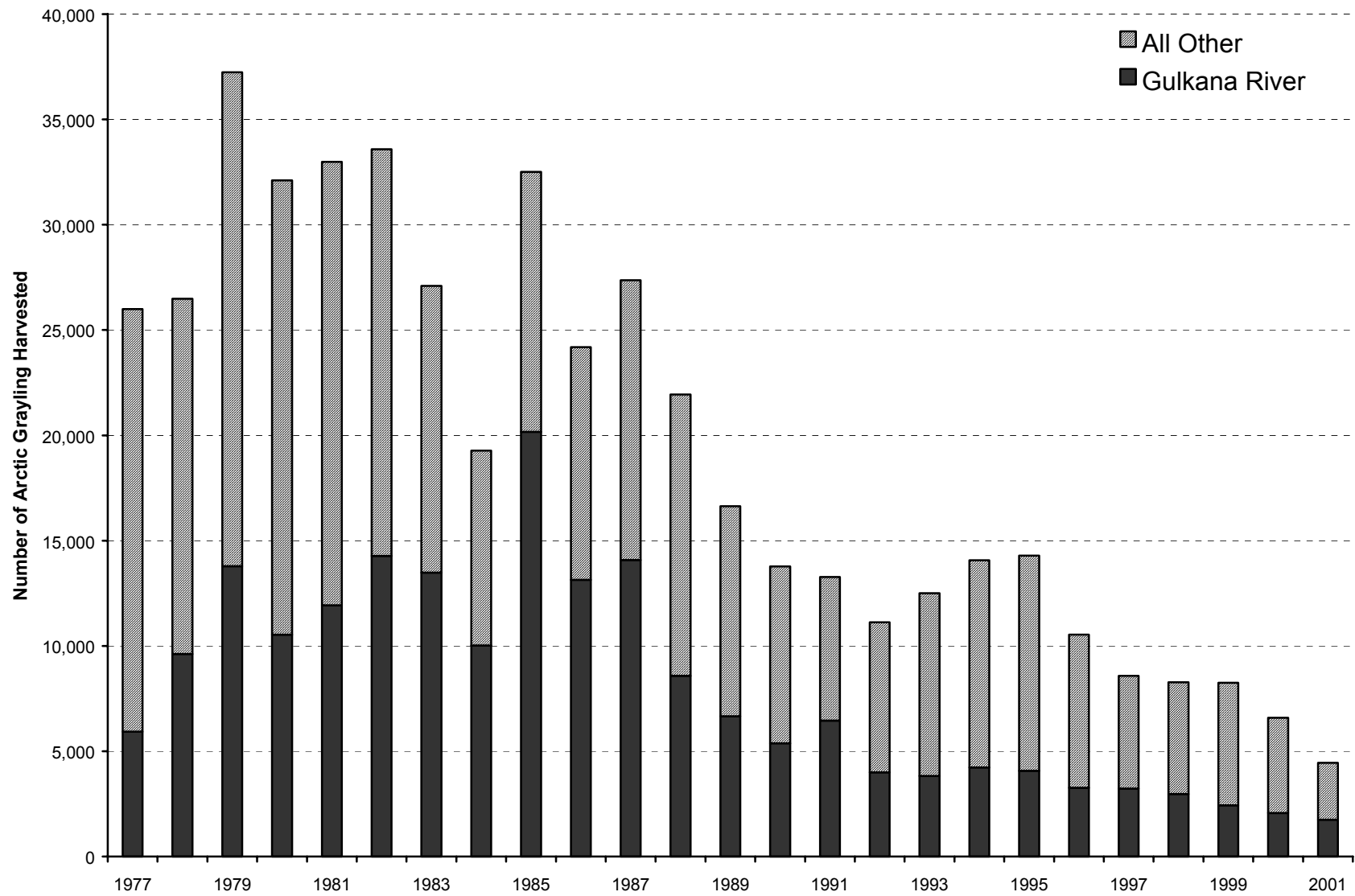


Figure 13.-Upper Copper/Upper Susitna Area Arctic grayling harvest, 1977-2001.

**Table 19.-Harvest of Arctic grayling by recreational anglers fishing UCUSMA by drainage, averaged for 1977 – 1989 and annually from 1990 to 2001.**

Areas	1977-1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>e</sup>	1995-1999 <sup>e</sup>
<b>Gulkana R. Drainage</b>															
Lakes	3,213 <sup>f</sup>	1,461	1,932	902	1,483	1,488	1,241	819	630	499	625	709	278	<b>1,108</b>	<b>763</b>
Upper River	3,808 <sup>f</sup>	1,850	2,888	1,691	1,409	2,076	1,811	1,961	1,646	1,622	1,063	977	988	<b>1,802</b>	<b>1,621</b>
Lower River	1,093 <sup>f</sup>	493	171	188	114	384	483	192	676	654	647	134	360	<b>400</b>	<b>530</b>
Gulkana River other <sup>a</sup>	5,558	1,579	1,467	1,210	822	281	536	291	276	200	91	242	127	<b>675</b>	<b>279</b>
<b>Total</b>	<b>11,703<sup>e</sup></b>	<b>5,383</b>	<b>6,458</b>	<b>3,991</b>	<b>3,828</b>	<b>4,229</b>	<b>4,071</b>	<b>3,263</b>	<b>3,228</b>	<b>2,975</b>	<b>2,426</b>	<b>2,062</b>	<b>1,753</b>	<b>3,985</b>	<b>3,193</b>
<b>Upper Susitna Drainage</b>															
Lake Louise		1,613	875	481	994	1,239	1,040	689	333	990	637	632	220	<b>889</b>	<b>738</b>
Susitna/Tyone Lk		119	330	639	661	949	1,273	376	271	249	261	568	173	<b>513</b>	<b>486</b>
Other Lakes		646	125	218	93	301	254	805	68	335	150	23	154	<b>300</b>	<b>322</b>
Streams		866	693	706	1,082	1,157	1,485	1,103	681	228	624	939	190	<b>863</b>	<b>824</b>
<b>Total</b>	<b>3,983<sup>b</sup></b>	<b>3,244</b>	<b>2,023</b>	<b>2,044</b>	<b>2,830</b>	<b>3,646</b>	<b>4,052</b>	<b>2,973</b>	<b>1,353</b>	<b>1,802</b>	<b>1,672</b>	<b>2,162</b>	<b>737</b>	<b>2,564</b>	<b>2,370</b>
<b>Klutina R. Drainage</b>															
	1,168 <sup>c</sup>	544	1,092	346	681	363	285	183	165	517	530	134	267	<b>471</b>	<b>336</b>
<b>Tazlina R. Drainage</b>															
Mendeltna Creek	283 <sup>c</sup>	170	102	255	867	906	1,041	570	462	579	79	245	70	<b>503</b>	<b>546</b>
Other Lakes	401 <sup>c</sup>	374	353	347	206	734	678	412	458	442	126	228	25	<b>413</b>	<b>423</b>
Other Streams	543 <sup>c</sup>	204	842	128	518	274	581	437	10	48	580	46	95	<b>362</b>	<b>331</b>
<b>Total</b>	<b>1,227<sup>c</sup></b>	<b>748</b>	<b>1,297</b>	<b>730</b>	<b>1,591</b>	<b>1,914</b>	<b>2,300</b>	<b>1,419</b>	<b>930</b>	<b>1,069</b>	<b>785</b>	<b>519</b>	<b>190</b>	<b>1,278</b>	<b>1,301</b>
<b>Tonsina Drainage</b>															
	551 <sup>c</sup>	289	296	811	814	363	261	192	82	495	368	123	128	<b>397</b>	<b>280</b>

-continued-

**Table 19.-Page 2 of 2.**

Areas	1977-1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>c</sup>	1995-1999 <sup>c</sup>
<b>Copper R Upstream of Gulkana</b>															
Lakes	662 <sup>c</sup>	883	216	113	378	234	321	147	101	147	147	48	102	269	173
Streams	587 <sup>c</sup>	119	466	30	356	125	210	158	101	197	77	19	141	184	149
<b>Total</b>	<b>1,249<sup>c</sup></b>	<b>1,002</b>	<b>682</b>	<b>143</b>	<b>734</b>	<b>359</b>	<b>531</b>	<b>305</b>	<b>202</b>	<b>344</b>	<b>224</b>	<b>67</b>	<b>243</b>	<b>453</b>	<b>321</b>
<b>Copper R Downstream of Klutina<sup>d</sup></b>															
Lakes	351 <sup>c</sup>	136	11	15	317	82	166	121	148	150	67	0	29	121	130
Streams	108 <sup>c</sup>	0	34	0	19	41	0	73	121	0	0	0	0	29	39
<b>Total</b>	<b>459<sup>c</sup></b>	<b>136</b>	<b>45</b>	<b>15</b>	<b>336</b>	<b>123</b>	<b>166</b>	<b>194</b>	<b>269</b>	<b>150</b>	<b>67</b>	<b>0</b>	<b>29</b>	<b>150</b>	<b>169</b>
<b>Other Sites</b>															
Stocked Lakes	491 <sup>c</sup>	935	726	1,623	852	1,167	804	726	570	223	1,265	521	473	889	718
Other Lakes	1,150 <sup>c</sup>	1,035	68	767	334	1,238	665	608	903	266	357	764	561	624	560
Other Stream	1,558 <sup>c</sup>	459	591	655	504	664	1,154	671	882	434	551	238	69	657	738
<b>Total</b>	<b>3,199<sup>c</sup></b>	<b>2,429</b>	<b>1,385</b>	<b>3,045</b>	<b>1,690</b>	<b>3,069</b>	<b>2,623</b>	<b>2,005</b>	<b>2,355</b>	<b>923</b>	<b>2,173</b>	<b>1,523</b>	<b>1,103</b>	<b>2,170</b>	<b>2,016</b>
<b>Area Total</b>	<b>27,490<sup>e</sup></b>	<b>13,775</b>	<b>13,278</b>	<b>11,125</b>	<b>12,504</b>	<b>14,066</b>	<b>14,289</b>	<b>10,534</b>	<b>8,583</b>	<b>8,275</b>	<b>8,245</b>	<b>6,590</b>	<b>4,450</b>	<b>11,467</b>	<b>9,985</b>

<sup>a</sup> Includes harvests not specified as taken in lower or upper river.

<sup>b</sup> Includes all upper Susitna lakes and streams.

<sup>c</sup> Includes 1983-1989 average only. Prior to 1983, this harvest was included in “other waters” in the SWHS report.

<sup>d</sup> Does not include the Tonsina River drainage.

<sup>e</sup> Average value for the years depicted.

<sup>f</sup> Includes 1983-1989 average only. Prior to 1983, this harvest was not separate and included in “Gulkana River”.



grayling harvest from UCUSMA waters (Table 20). In recent years, harvests from the drainage have declined; 32% of the grayling harvest came from the drainage during the period 1995-1999. A discussion of the Arctic grayling fishery in the Gulkana River drainage follows this area-wide summary. Other UCUSMA drainages that have supported significant grayling fisheries include the Klutina and Tazlina drainages and various upper Susitna River drainage lakes and streams. Various lakes stocked with grayling catchables also provide fishing opportunity for this species.

To assure sustainable yield of grayling, daily bag and possession limits for grayling in all flowing waters in the UCUSMA were reduced from 15 daily and 30 in possession to 10 fish daily and in possession in 1988. In 1989, the bag and possession limit for grayling in rivers was further reduced to five grayling. For the Gulkana River, anglers were permitted five grayling but only one grayling per day over 14 inches. This action was taken to maintain historic size compositions in this drainage. The bag and possession limits in stocked lakes and those lakes without management concern remained at 10 per day and in possession. Under these regulations, most grayling stocks in the UCUSMA are currently considered healthy.

Mendeltna Creek is a small stream in the Tazlina drainage located west of Glennallen and drains into Tazlina Lake. Main access points are at the Glenn Highway wayside and a single lane gravel road (Oil Well Road) off the Lake Louise Road. Harvests increased significantly between 1992 and 1993, 255 to 867 grayling, and peaked in 1995 at 1,041 (Table 19). There is little baseline data on the grayling population in Mendeltna Creek, stock assessment began on this system in 1998 and resulted in an abundance estimate for July 1999 of 845 fish  $\geq 200$  mm (approximately 8 in; Scanlon and Fish 2000). The harvest of 79 Arctic grayling in 1999 was the lowest since 1983.

Management of the grayling population in Mendeltna Creek has been limited to evaluation of the SWHS. Arctic grayling populations can sustain exploitation rates of approximately 10%. Stock assessment conducted on Mendeltna Creek estimated the population at less than 900 grayling, with few fish greater than 12 inches (Scanlon and Fish 2000). At the current population level, only 80 grayling could be harvested annually. Based upon examination of the SWHS statistics, bag limits reductions would not reduce the harvest sufficiently to provide for sustainable yield. The department submitted a proposal for the 1999 BOF meeting to reduce the daily bag limit to 2 fish over 12 in total length. The open season was set from June 1 to March 31, to offer protection to the larger spawning grayling. The Board supported this proposal and the regulation went into effect for the 2000 season.

Little is known about the distribution of Arctic grayling in the UCUSMA. Many of the roadside-accessible streams are located in the Tazlina drainage. Tagging or telemetry studies could provide information regarding timing of grayling through the fisheries, spawning and rearing streams and distributions throughout the drainage.

## **Gulkana River Arctic Grayling Sport Fishery**

### **Background and Historical Perspective**

The Gulkana River drainage supports the largest grayling population in the UCUSMA. This clearwater drainage originates in the Alaska Range and flows south to join the Copper River near the community of Gulkana (Figure 7). Access to the river is available from various secondary roads and trails off the Richardson Highway, which parallels much of the river. Anglers use rafts, canoes, and powerboats to gain access to the more remote sections of the river. Raft and canoe anglers frequent the various sections of the river from Paxson Lake downstream to the

**Table 20.-Harvest and catch of Arctic grayling by recreational anglers fishing the Gulkana River drainage, averaged for 1977 – 1989 and annually from 1990 to 2001.**

Year	Gulkana River Drainage Harvest			Percentage of UCUS harvest	Number Caught	Percent Released
	Rivers & Streams	Lakes	Total			
1977-1989 <sup>a</sup>	8,490	3,213	11,703	43	N/A	N/A
1990	3,922	1,461	5,383	39	40,768	87
1991	4,526	1,932	6,458	49	34,600	81
1992	3,089	902	3,991	36	32,316	88
1993	2,345	1,483	3,828	31	45,865	92
1994	2,741	1,488	4,229	30	37,893	89
1995	2,830	1,241	4,071	28	29,102	86
1996	2,444	819	3,263	31	40,710	92
1997	2,598	630	3,228	38	43,575	93
1998	2,476	499	2,975	36	46,937	94
1999	1,801	625	2,426	29	39,266	94
2000	1,353	709	2,062	31	28,781	93
2001	1,475	278	1,753	39	31,496	94
<b>1990-1999<sup>a</sup></b>	<b>2,877</b>	<b>1,108</b>	<b>3,985</b>	<b>35</b>	<b>39,103</b>	<b>90</b>
<b>1995-1999<sup>a</sup></b>	<b>2,430</b>	<b>763</b>	<b>3,193</b>	<b>32</b>	<b>39,918</b>	<b>92</b>

<sup>a</sup> Average value for the years depicted.

Richardson Highway Bridge. Powerboat operators generally launch at Sourdough and use the river from approximately 2 miles below Sourdough upstream to the confluence of the West Fork. Recently powerboat operators have begun launching from the Richardson Highway bridge and fishing the 5-mile reach of the river above the bridge. The section of the Gulkana River upstream from Sourdough has been designated by the U.S. Congress as “wild” as part of the Wild and Scenic Rivers Act of 1968. The Gulkana River from the Richardson Highway bridge downstream to a department marker 500 yards downstream of its confluence with the Copper River is an area in which only single hook, artificial flies may be used from June 1 to July 31. This area has low use, except near the Richardson Highway, and is used primarily by walk-in anglers from the Richardson Highway, but powerboat operators occasionally access the confluence of the Gulkana River with the Copper River after launching from Gakona or from the Richardson Highway bridge.

The Gulkana River drainage has historically supported the largest sport fishery for grayling in the UCUSMA. From 1977 through 1985, harvests of grayling from the Gulkana River drainage generally increased. A peak harvest of 20,165 fish occurred in 1985 and accounted for 62% and 35% of the total harvest in the UCUSMA and Southcentral region, respectively (Mills 1986).

The peak harvest experienced in 1985 raised concern that the grayling stocks in the drainage were in danger of overharvest, given that grayling stocks in several interior Alaska streams were depressed when subjected to similar harvest rates. Regulations were adopted in 1988 that reduced the bag and possession limit to five fish per day. Also, past research data indicated that the maximum size of grayling observed in the Gulkana River drainage was decreasing as the result of anglers targeting larger fish (Williams and Potterville 1983). In an attempt to maintain historic size compositions, regulations were also adopted in 1988 that restricted anglers to only one grayling over 14 inches.

A research program was initiated by the Division of Sport Fish in 1986 to assess the status of the various grayling stocks of the Gulkana River drainage. Beginning in 1988, the study was conducted in conjunction with the University of Alaska and formed the basis of an M.S. thesis. Objectives of the research program were to determine stock structure, growth, annual abundance, survival, and recruitment; sustainable yields under a variety of management scenarios; and future monitoring strategies. This project was completed in June 1993 and the final report/thesis was completed in 1995 (Bosch 1995).

### **Recent Fishery Performance**

The restrictions placed on the fishery during 1988 have significantly reduced the total harvest of grayling in the Gulkana River drainage (Figure 13). The 2000 and 2001 grayling harvests are the lowest since harvest data began being collected in 1977. No assessment was conducted on the Gulkana River in 2000; it is assumed that grayling harvest remained stable.

Estimates of abundance indicate that current exploitation rates on the major stock units of grayling in the Gulkana River drainage appear sustainable given current harvest levels. Data from the research program also indicate that the restriction limiting anglers to only one grayling over 14 in is allowing the population to reach and maintain historic levels (Fish and Roach 1999).

### **Management Objectives**

Grayling fisheries in the Gulkana River drainage are managed to assure maintenance of historic age and size composition and stock abundance. Harvest and catch of Arctic grayling are

monitored by the SWHS. In 1998, stock assessment was conducted for comparison of age and size composition to previous assessment studies conducted in the early 1990's (Bosch 1995). Data collected in 1998 indicates that the grayling population in the Gulkana River, through the restrictive regulations, has a larger proportion of fish, greater than 14", than were present in the early 1990's (Fish and Roach 1999).

### **Fishery Outlook**

It is anticipated that harvest levels of Arctic grayling will remain at recent levels. The current regulations appear to be maintaining the population at historic levels.

### **Recent Board of Fisheries Actions**

During the 1996 meetings the BOF passed a proposal submitted by the department to establish a catch and release grayling fishery in the upper Gulkana River drainage (upstream of Paxson Lake). The intent of this regulation is to protect a small population of large sized grayling (> 18 in) in the Gunn and Fish Creek drainages. The upper Gulkana River above Paxson Lake is easily accessible from the Richardson Highway by foot and ATV. The research conducted by Bosch (1995) indicated that the upper Gulkana grayling population was separate from the Middle Fork and mainstem populations, and that though the population is small, the fish are large. The department determined that this population would be a candidate for a trophy catch and release fishery in order to preserve the current size composition of the population. This regulation has not affected the overall harvest of grayling in the Gulkana drainage, it may be that the majority of grayling caught in the upper Gulkana River were released prior to the regulation.

### **Current Issues**

Overall, Gulkana River drainage grayling stocks appear healthy. The ADF&G is planning to develop a management plan for grayling in the Gulkana River drainage. The plan will strive to provide a diversity of fishing opportunities for grayling in the Gulkana River drainage under sustained yield management. This plan will be distributed for public comment and after completion will be forwarded to the BOF at a future scheduled meeting dealing with UCUSMA issues, likely the fall of 2005. Until completion of this management plan, continuation of the current management strategy and regulatory regime is recommended.

Data collected through the statewide mail survey suggest that many anglers fishing grayling in the Gulkana River drainage are practicing catch and release. Anglers have released over 90% of their catch on average since 1990 (Table 20). Assuming a 5% release mortality rate, this appears acceptable given current harvest and abundance levels.

There has been some dissatisfaction with the BOF action in 1996 on the upper Gulkana River. Anglers, who had fished the upper Gulkana River prior to 1996 and harvested Arctic grayling, still desire to do so. This may result in a proposal during a future BOF meeting, to allow some minimal level of harvest in the upper Gulkana River.

### **Ongoing and Recommended Research and Management**

An objective of the research program was to develop a plan for monitoring the status of grayling stocks in the Gulkana River drainage. It is recommended that the following monitoring program be conducted to assure the sustained yield of the fishery. This consisted of annual monitoring of the mainstem stock for age composition and monitoring every three to five years for the upper reaches (upstream of Paxson Lake). The middle fork stock should be monitored by an abundance estimate and age composition every three to five years. Stock assessment was conducted in the mainstem for 1998, to determine age and length composition. Age and length

data was collected in 2001 in the mainstem Gulkana River, in conjunction with a management project, but analysis has not been completed. A similar assessment and abundance estimates for Gunn Creek and Fish Lake was conducted in 2002 on the upper reaches to determine the impacts of the recent regulatory change and provide background information for the BOF meeting (Gryski *In prep*).

## **LAKE TROUT SPORT FISHERIES**

### **Background and Historical Perspective**

Lake trout stocks of the UCUSMA provide significant fishing opportunities and economic benefit to the people of Alaska (Figure 14). This is the only area in Alaska where numerous lake trout fisheries exist along the road system. From 1977 through 1989, an average of 7,283 lake trout were harvested from UCUSMA lakes and streams annually, accounting for 41% of the statewide lake trout harvest and 71% of the AYK region harvests over this period (Table 21). From 1990 to 1999, lakes and streams of the UCUSMA have accounted for over 33% of the annual statewide harvest of lake trout and 62% of the AYK region harvests.

Most of the lake trout harvest in the UCUSMA has come from lakes within the Tyone River (Lake Louise and Susitna and Tyone lakes) and Gulkana River (Paxson, Susitna, and Crosswind lakes) drainages (Table 22). From 1990 to 1999, these two drainages have accounted for 89% of the UCUSMA lake trout harvest and an average of 29% of the statewide lake trout harvest. Paxson Lake and Lake Louise have supported the largest fisheries for lake trout in the UCUSMA and Alaska. Together, these two lakes have accounted for 49% of the UCUSMA lake trout harvest and an average of 16% of the annual statewide harvest of lake trout from 1990 to 1999. Other major sport fisheries for lake trout in the UCUSMA occur in Summit and Crosswind lakes (in the Gulkana River drainage) and in Susitna Lake (in the Tyone River drainage).

Prior to 1987, anglers fishing UCUSMA waters were allowed a daily take of two lake trout over 20 inches and 10 lake trout under 20 in. Under these regulations, lake trout harvests from UCUSMA waters were relatively stable, averaging about 7,500 (Table 22). A study conducted in 1986, however, suggested that eight of nine lake populations in the upper Copper and Delta River drainages were being harvested well over the annual harvest estimated to be sustainable based on lake trout populations in Canada and the Great Lakes (Burr 1987). As a result of these research findings, the daily bag limit for UCUSMA waters was reduced to two fish and a minimum size limit of 18 in was adopted for Summit and Paxson lakes, Lake Louise, and the remainder of the Tyone River drainage in 1987. The minimum size limit was imposed to allow female lake trout to spawn once before reaching harvestable size.

A research program was initiated in 1990 to evaluate the status of lake trout fisheries in the UCUSMA. The goal of the research program was to determine appropriate management strategies that assure the sustained yield of lake trout in UCUSMA lakes. The study was conducted primarily in Paxson Lake and Lake Louise. Annual results of the research project are summarized in Szarzi (1992, 1993), Szarzi and Bernard (1994, 1995, 1997).

In 1994, the minimum size limit for lake trout was increased from 18 to 24 inches in the Tyone drainage, Crosswind, Paxson and Summit lakes; the bag limit was reduced from two to one lake trout in the Tyone drainage and Crosswind Lake. The minimum size limit was increased to better protect female lake trout spawning for the first time in the Tyone drainage and Crosswind Lake and to reduce the harvest to a sustainable level in Paxson and Summit lakes. The bag limit

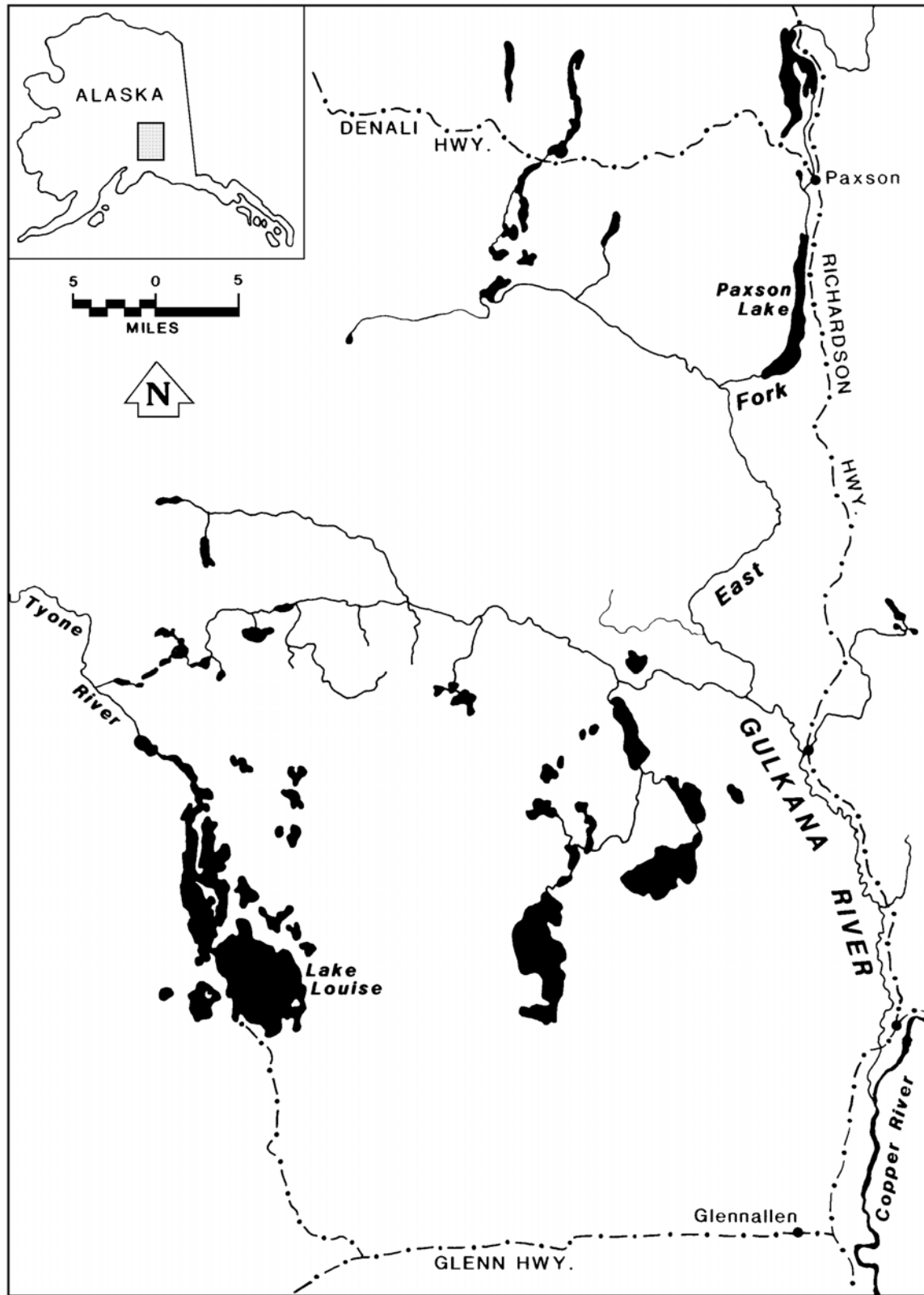


Figure 14.-Map of major lake trout fisheries in the UCUSMA.

**Table 21.-Harvest of lake trout by recreational anglers fishing UCUSMA waters, averaged for 1977–1989 and annually from 1990 to 2001.**

Year	UCUS Harvest	Alaska Harvest	Percent <sup>b</sup>	Region III Harvest	Percent <sup>c</sup>
1977-1989 <sup>a</sup>	7,283	17,577	41	10,278	71
1990	5,503	12,602	44	7,246	76
1991	4,864	13,772	35	7,897	62
1992	4,251	12,525	34	6,442	66
1993	4,569	13,094	35	7,167	64
1994	4,058	11,374	36	5,889	69
1995	2,934	8,412	35	4,266	69
1996	2,632	9,772	29	6,470	41
1997	1,923	7,486	26	3,289	59
1998	1,723	5,985	29	2,657	65
1999	2,135	9,948	22	4,131	52
2000	1,700	6,292	27	3,174	54
2001	1,185	4,995	24	1,903	62
<b>1990-1999<sup>a</sup></b>	<b>3,459</b>	<b>10,497</b>	<b>33</b>	<b>5,545</b>	<b>62</b>
<b>1995-1999<sup>a</sup></b>	<b>2,269</b>	<b>8,321</b>	<b>28</b>	<b>4,163</b>	<b>57</b>

<sup>a</sup> Average value for the years depicted.

<sup>b</sup> Percent of all lake trout harvested in state which were harvested in UCUS.

<sup>c</sup> Percent of all lake trout harvested in Region III which were harvested in UCUS.

**Table 22.-Harvest of lake trout by recreational anglers fishing UCUSMA waters by drainage, averaged for 1977 – 1989 and annually from 1990 to 2001.**

Areas	1977-89	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>c</sup>	1995-1999 <sup>c</sup>
<b>Gulkana Drainage</b>															
Paxson Lake	1,310 <sup>a</sup>	2,139	1,248	1,118	778	262	507	297	452	205	342	228	302	735	361
Summit Lake	715 <sup>a</sup>	968	981	524	344	353	224	120	158	59	220	79	74	395	156
Crosswind Lake	488	306	463	378	311	429	94	339	96	238	525	297	44	318	258
Other Lakes	15 <sup>a</sup>	68	28	85	256	66	0	42	10	24	54	27	22	63	26
Gulkana River	193 <sup>c</sup>	102	70	155	20	44	90	294	132	15	14	0	64	94	109
<b>Total</b>	<b>2,721</b>	<b>3,583</b>	<b>2,790</b>	<b>2,260</b>	<b>1,709</b>	<b>1,154</b>	<b>915</b>	<b>1,092</b>	<b>848</b>	<b>541</b>	<b>1,155</b>	<b>631</b>	<b>506</b>	<b>1,605</b>	<b>910</b>
<b>Upper Susitna Drainage</b>															
Lake Louise	2,000 <sup>d</sup>	1,036	1,332	1,033	1,316	1,463	946	662	585	625	430	563	259	943	650
Susitna Lake	631 <sup>d</sup>	187	308	324	669	426	200	381	52	131	176	131	110	285	188
Other Lakes	436 <sup>d</sup>	119	182	348	295	308	173	208	100	135	162	66	118	203	156
Streams	0	0	14	0	19	140	199	44	0	0	0	9	0	42	49
<b>Total</b>	<b>3,067<sup>d</sup></b>	<b>1,342</b>	<b>1,836</b>	<b>1,705</b>	<b>2,299</b>	<b>2,337</b>	<b>1,518</b>	<b>1,295</b>	<b>737</b>	<b>891</b>	<b>768</b>	<b>769</b>	<b>487</b>	<b>1,473</b>	<b>1,042</b>
<b>Klutina Drainage</b>															
	201 <sup>b</sup>	68	84	39	28	74	71	22	33	12	35	18	17	47	35
<b>Tazlina Drainage</b>															
	29	51	42	62	0	15	0	11	23	56	16	83	0	28	21
<b>Copper River Drainage</b>															
Upstream of Gulkana	227 <sup>b</sup>	102	42	23	145	309	164	81	100	95	89	27	97	115	106
Downstream of Klutina	25 <sup>b</sup>	136	0	0	0	22	20	0	0	0	0	0	0	18	4
<b>Other Sites</b>															
	508 <sup>b</sup>	221	70	162	388	147	246	131	182	128	72	172	78	175	152
<b>Area Total</b>	<b>7,283<sup>e</sup></b>	<b>5,503</b>	<b>4,864</b>	<b>4,251</b>	<b>4,569</b>	<b>4,058</b>	<b>2,934</b>	<b>2,632</b>	<b>1,923</b>	<b>1,723</b>	<b>2,135</b>	<b>1,700</b>	<b>1,185</b>	<b>3,459</b>	<b>2,269</b>

<sup>a</sup> Includes 1984-1988 average only. Prior to 1984 Paxson and Summit lake harvests were combined.

<sup>b</sup> Includes 1983-1988 average only. Prior to 1983, this harvest was included in “other waters” in the SWHS report.

<sup>c</sup> Includes lower river harvest.

<sup>d</sup> Includes 1984-1988 average only. Prior to 1984 Louise, Susitna, and Tyone lake harvests were combined.

<sup>e</sup> Average value for the years depicted.



**Table 23.-Percent of lake trout released in lakes with 24” minimum size limit, 1990-2001<sup>a</sup>.**

Year	Paxson	Summit	Crosswind	Louise	Susitna	Average of all lakes
1990	52	61	77	65	82	67
1991	39	47	60	37	59	48
1992	53	54	73	67	68	63
1993	68	79	76	81	67	74
1994	79	65	79	71	67	72
1995	71	81	90	66	76	77
1996	85	84	72	78	82	80
1997	78	77	79	80	89	81
1998	88	85	85	75	66	80
1999	89	67	80	91	82	82
2000	89	77	67	82	86	80
2001	84	88	92	83	88	87
<b>1990-1993</b>	<b>53</b>	<b>60</b>	<b>72</b>	<b>63</b>	<b>69</b>	<b>63</b>
<b>1994-2001</b>	<b>83</b>	<b>78</b>	<b>81</b>	<b>78</b>	<b>80</b>	<b>80</b>

<sup>a</sup> The 24” minimum size limit went into effect prior to the 1994 fishing season.

reduction was imposed on lakes with lake trout of greater than average length to prevent effort from being concentrated on these size classes.

### **Recent Fishery Performance**

Since adoption of the new regulations in 1987 and further restrictions in 1994, lake trout harvests from UCUSMA lakes and streams have fallen. The 2000 harvest of 1,700 lake trout was similar to the previous three years and less than the recent 5-year average (Table 22). The 2001 harvest of 1,185 lake trout was the lowest on record. In general, harvests from both the Gulkana River and Tyone River drainages have declined or remained stable since 1994.

As a result of the 24" minimum size restriction, the number of lake trout release in these lakes has increased (Table 23). Theoretically, under the current regulations a greater number lake trout are allowed to spawn once before harvest, resulting in an increase of lake trout production. As this larger number of small lake trout reach the 24" size, the percent of lake trout released in these lakes will likely decrease.

### **Management Objectives**

Two methods are available to assess the current status of lake trout fisheries in the UCUSMA. The first involves estimating the level of sustainable harvests for lakes based on an observed lake trout production-lake surface area relationship for northern latitude lakes (Evans et al. 1991). Because estimates of the average weight of lake trout from most lakes in the UCUSMA are unavailable, the sustainable harvest of lake trout has been estimated based on the probable range of lake trout weights: 1.0 to 3.5 kg. Based on Evans et al. approach and these assumed weights, lakes in the UCUSMA which are less than 500 ha appear capable of sustaining harvests of 30 to 350 lake trout annually depending, in part, upon their elevation, depth, acreage, and available spawning habitat. Based on these estimates, the harvest of lake trout from lakes smaller than 500 ha appears to be slightly below estimates of sustainable yield. For lakes larger than 500 ha which are not road accessible (e.g., Crosswind, Tanada, and Copper lakes), harvests also appear below estimates of sustainable yield. These larger lakes appear capable of sustaining annual harvests from about 100 to 575 lake trout, or specifically 467 lake trout from Crosswind Lake, 219 lake trout from Copper Lake and 284 lake trout from Tanada Lake. For lakes larger than 500 ha which are road accessible (e.g., Paxson, Summit, Susitna lakes and Lake Louise), Evans et al. method provides yield estimates of 416 lake trout from Paxson Lake, 773 lake trout from Lake Louise, 526 lake trout from Susitna Lake, and 430 lake trout from Summit Lake. Based upon these estimates of yield, current harvests of lake trout appear to be below sustainable levels.

An alternate approach based on the volume of water in the preferred temperature range for lake trout (8° to 12°C), termed the thermal habitat volume (THV), was examined to estimate the current status of lake trout stocks in these lakes. Based on the THV approach, the sustainable yield for Paxson Lake is 0.92 kg ha<sup>-1</sup> y<sup>-1</sup>, for Lake Louise 0.89 kg ha<sup>-1</sup> y<sup>-1</sup>, and for Susitna Lake 0.90 kg ha<sup>-1</sup> y<sup>-1</sup>. Thermal habitat volume information is not available for Summit Lake. Using the average weight of lake trout harvested in each lake to convert yields to numbers of fish, the sustainable harvest from Paxson Lake is approximately 800 lake trout, Lake Louise 2,123 lake trout, and Susitna Lake 1,191 lake trout. These yields are more than double the yields based on Evans et al. approach. Estimates of maximum sustainable yield based on a Lake Area model (Evans et al.) and the THV model have the potential for overestimating sustainable harvests. Both models were developed in Ontario, Canada. Ontario lakes have greater productivity than Alaskan lakes, and as a result the estimates of sustainable yield are erroneously high for UCUSMA lakes, and must be used only as a signal for regulatory adjustments or stock

assessment. Lake trout are slow to mature and have low reproductive potential, overexploitation could result in population declines that would take multiple years for recovery. Based upon this information, a conservative management strategy is desired for the UCUSMA lakes, maintaining harvest levels below the lowest estimates of maximum sustainable yield determined by the methods described above. As a result of the low reproductive potential and late maturity (lake trout in UCUSMA lakes do not spawn until 6 years of age), impacts of regulatory actions may not be observed for 8-10 years after the regulation is in place.

Fishery objectives have yet to be defined for specific UCUSMA lake trout fisheries. To date, regulations have been written to assure that maximum sustained yield of the UCUSMA lake trout resource is not exceeded. It is likely that as fishery objectives are defined for specific lake trout fisheries, they will center on assuring for optimum, rather than maximal, sustained yield. For some lakes, optimum sustained yield will equal maximum sustained yield; for other lakes, however, optimum sustained yield will be lower than maximum sustained yield to accommodate angler's wishes for trophy or other types of special fisheries.

### **Fishery Management**

Under a conservative management strategy many of the regulations in the UCUSMA area have conservative bag limits and size restrictions. The size restrictions provide an opportunity for the majority of lake trout to spawn at least once prior to harvest. Bag limits in the Tyone River drainage are limited to one fish per day; any increase in harvest opportunity could potentially result in a doubling of harvests. Assessment of lake trout stock status is currently based on evaluation of the SWHS. Stock assessment was discontinued in 1995 and information regarding the 2002 fishery will not be available until 2003. Since the majority of Alaskan lakes do not get the temperature stratification seen in Ontario lakes, the preferred method for maximum sustained yield estimation is the Lake Area Model. As mentioned previously, these estimates are guidelines and actual maximum sustained yield should be considered to be below the Lake Area Model estimates.

### **Fishery Outlook**

Under the current regulations, it is anticipated that harvests of lake trout will remain stable. Harvests have declined with the 1994 regulation changes, particularly in the Gulkana drainage where the 5-year average is nearly half of the 10-year average. The upper Susitna drainage has not seen as large a decline, though bag limits were reduced from two to one fish in 1994. The lake trout populations in the Tyone drainage and Crosswind Lake are larger on average than Gulkana drainage trout populations and the 24-inch minimum size restriction would have a greater impact on those lakes. This is likely the reason the Gulkana drainage lakes saw a larger decline in harvests.

### **Recent Board of Fisheries Action**

No proposals regarding lake trout were considered by the Board of Fisheries during the 1996 meeting. One proposal regarding lake trout was submitted to the 1999 BOF meeting requesting an increased bag limit to two lake trout on Crosswind Lake. Based upon current harvest levels at Crosswind Lake (average harvest of 293 trout from 1989 to 1998), a potential doubling of harvest would exceed the estimate of maximum sustainable yield of 467 based on the Lake Area model. The BOF did not support this proposal. There are four proposals submitted to the BOF for the 2002 meeting, three requesting increases in the lake trout bag limits on Paxson, Summit and Crosswind lakes, and one requesting a bait restriction on Paxson and Summit lakes.

## **Current Issues**

The present regulatory regime should protect all UCUSMA lake trout stocks from overharvest and allow increase abundance. Angler preferences for small lake trout to eat and trophies to admire are not being met in the larger lakes in the UCUSMA, however. A protected slot limit would achieve such an end.

Protected slot limits increase abundance by protecting the most productive fish while allowing a harvest of abundant small fish and less abundant but larger trophy-sized fish. Protected slot limits are in use on lake trout fisheries in Ontario but, to date, their effect has not been determined (Hicks and Quinn 1990). Inappropriate application of slot limits was found to crop off larger fish and create a stockpile of small fish in a brown trout population studied by Barnhart and Engstrom-Heg (1984).

Anglers in the UCUSMA lakes support slot limits, but managers feel that a slot limit is not appropriate for these lakes at this time, as the abundance of immature lake trout has not been estimated. Increasing effort on this element of the population might reduce abundance by removing too much of the potential spawning stock needed to rebuild or sustain the population.

## **Recommended Research and Management**

Research on lake trout has resumed on a limited basis. Fall sampling at Lake Louise and Paxson Lake ended in 1995, a final spring/summer sampling event occurred in 1997 (Szarzi and Bernard 1997). Fall sampling occurred at Paxson Lake in 2002 to collect size and weight data, and mark spawning lake trout for abundance estimation (Scanlon *In prep*). Weight data will provide specific information for Paxson Lake in application with the Lake Area model. The feasibility of slot limits needs to be examined in select fisheries (Tyone drainage lakes, Crosswind Lake), in conjunction with a monitoring program to determine length and age composition changes. More information is needed regarding the characteristics of the life history and harvest of other lake trout stocks which have the potential to be overexploited including: size and age structure, maturity schedules, abundance and yield, and the contribution of the winter fishery to the lake trout harvests. Lakes of particular interest for stock assessment are Copper and Tanada lakes, accessed from the Nabesna Road via a 12-mile trail, Kimball Pass Lake, accessed on a 16-mile trail from the Richardson Highway, Crosswind Lake, east of Lake Louise and accessed by float plane or snowmachine, and Klutina Lake accessed from the Richardson Highway by the Klutina River Road (Brenwick-Craig Road).

## **BURBOT SPORT FISHERIES**

### **Background and Historical Perspective**

The many lakes and rivers of the UCUSMA support some of the largest populations of burbot in Alaska and, prior to 1990, supported an average of 56% of the statewide sport harvest of this species (Table 24; Figure 15). The largest fishery has historically occurred in the Lake Louise complex (consisting of Lake Louise, Susitna and Tyone lakes; Table 25). Other significant fisheries occur in the various lakes of the Gulkana River drainage (e.g., Paxson, Summit, and Crosswind lakes), Tolsona and Moose lakes, and various smaller remote lakes scattered throughout the UCUSMA. The fishery occurs primarily during the winter months from November to April using closely attended set or hand jig lines.

Prior to 1979, there were no daily bag or possession limits or gear restrictions governing the harvest of burbot in the UCUSMA. In recognition of burbot as an important sport species to be managed for sustained yield, a daily bag and possession limit of 15 burbot was enacted prior to

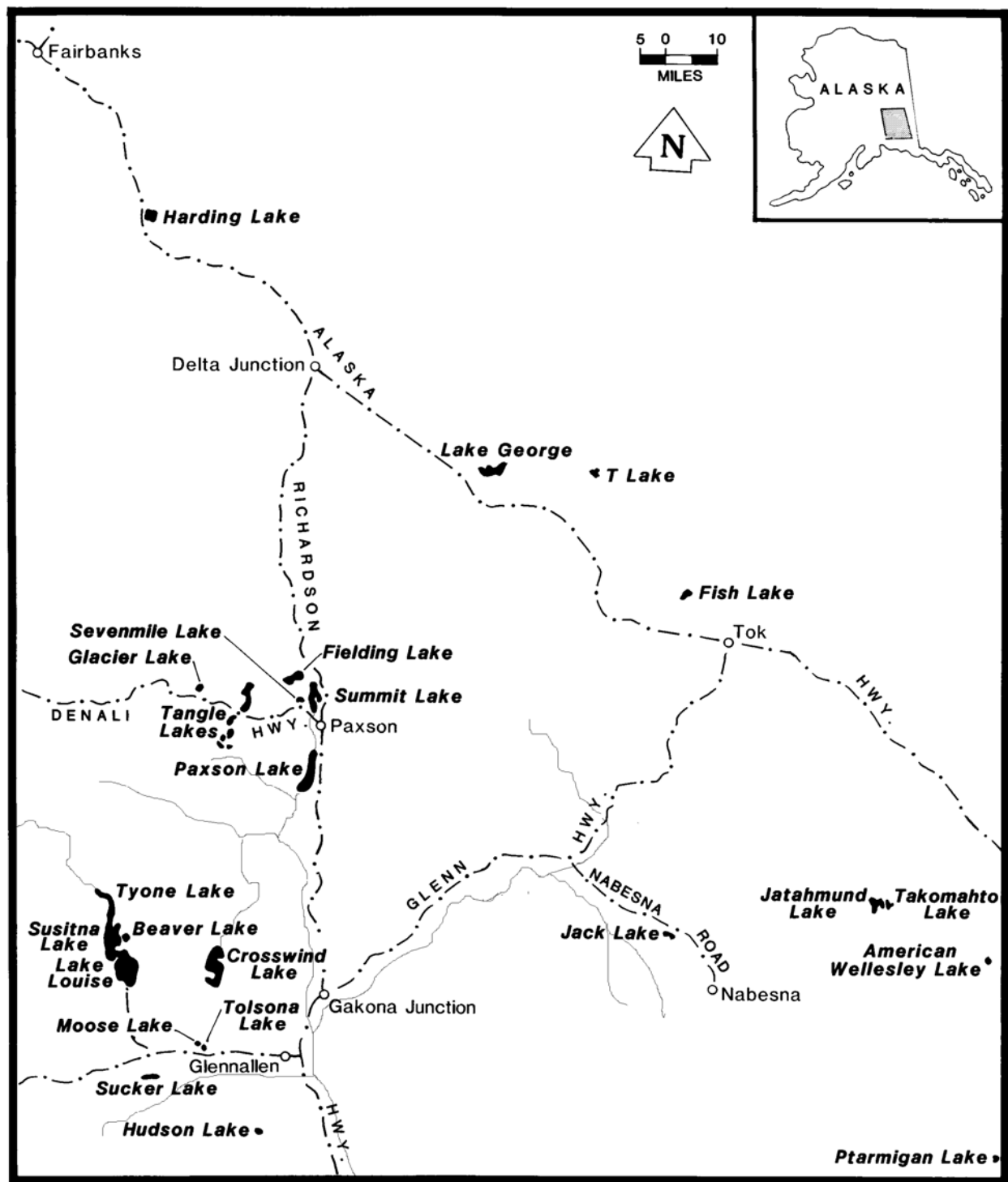


Figure 15.-Lakes supporting major burbot fisheries in the UCUSMA.

**Table 24.-Harvest of burbot by recreational anglers fishing UCUSMA waters, averaged for 1977 – 1989 and annually from 1990 to 2001.**

Year	UCUS Harvest	Alaska Harvest	Percent	Region III Harvest	Percent
1977-1989 <sup>a</sup>	7,818	14,035	56	12,037	65
1990	1,836	10,577	17	7,319	25
1991	793	4,882	16	3,848	21
1992	1,495	7,245	21	5,748	26
1993	1,694	9,858	17	8,160	21
1994	2,869	10,868	26	8,572	34
1995	995	7,128	14	6,270	16
1996	981	5,841	17	4,792	21
1997	1,358	12,189	11	8,614	16
1998	1,485	6,882	22	5,304	28
1999	1,861	6,903	27	5,530	34
2000	2,290	9,809	23	7,257	32
2001	1,506	3,744	40	3,004	50
<b>1990-1999<sup>a</sup></b>	<b>1,537</b>	<b>8,237</b>	<b>19</b>	<b>6,416</b>	<b>24</b>
<b>1995-1999<sup>a</sup></b>	<b>1,336</b>	<b>7,789</b>	<b>18</b>	<b>6,102</b>	<b>23</b>

<sup>a</sup> Average value for the years depicted.

**Table 25.-Harvest of burbot caught by recreational anglers fishing in the UCUSMA by drainage, averaged for 1977 – 1989 and annually from 1990 to 2001.**

Areas	1977-89	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>d</sup>	1995-1999 <sup>d</sup>
<b>Gulkana River Drainage</b>															
Lakes	783	561	343	304	257	629	340	151	786	682	782	1,290	1,059	484	548
Streams	69	17	27	127	0	0	7	48	26	9	0	12	0	26	18
<b>Total</b>	<b>852</b>	<b>578</b>	<b>370</b>	<b>431</b>	<b>257</b>	<b>629</b>	<b>347</b>	<b>199</b>	<b>812</b>	<b>691</b>	<b>782</b>	<b>1,302</b>	<b>1,059</b>	<b>510</b>	<b>566</b>
<b>Upper Susitna Drainage</b>															
Lake Louise	3,173 <sup>a</sup>	255	0	0	0	0	0	0	0	0	0	0	0	26	0
Susitna/Tyone Lakes		323	45	533	172	766	137	163	262	149	670	609	154	322	276
Other Waters	1,022	0	54	8	0	145	46	49	52	118	0	0	36	47	53
<b>Total</b>	<b>4,195</b>	<b>578</b>	<b>99</b>	<b>541</b>	<b>172</b>	<b>911</b>	<b>183</b>	<b>212</b>	<b>314</b>	<b>267</b>	<b>670</b>	<b>609</b>	<b>190</b>	<b>395</b>	<b>329</b>
<b>Klutina River Drainage</b>	13 <sup>c</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Tazlina Drainage</b>															
Moose/Tolsona	1,392 <sup>c</sup>	408	108	127	21	93	23	81	0	0	0	0	0	86	21
Hudson	337	0	0	0	0	31	103	0	0	59	0	0	0	19	32
Other	378 <sup>c</sup>	0	81	245	86	114	0	57	26	401	117	222	136	113	120
<b>Total</b>	<b>2,310<sup>c</sup></b>	<b>408</b>	<b>189</b>	<b>372</b>	<b>107</b>	<b>238</b>	<b>126</b>	<b>138</b>	<b>26</b>	<b>460</b>	<b>117</b>	<b>222</b>	<b>136</b>	<b>218</b>	<b>173</b>
<b>Copper River</b>															
Upstream of Gulkana	225 <sup>c</sup>	238	0	8	611	799	122	73	129	50	152	12	14	218	105
Downstream of Klutina	23 <sup>c</sup>	0	0	0	0	42	34	41	0	0	0	121	0	12	15
<b>Other Sites</b>	828 <sup>c</sup>	34	135	143	547	250	183	318	77	17	140	24	107	184	147
<b>Area Total</b>	<b>7,818<sup>d</sup></b>	<b>1,836</b>	<b>793</b>	<b>1,495</b>	<b>1,694</b>	<b>2,869</b>	<b>995</b>	<b>981</b>	<b>1,358</b>	<b>1,485</b>	<b>1,861</b>	<b>2,290</b>	<b>1,506</b>	<b>1,537</b>	<b>1,336</b>

<sup>a</sup> Includes Susitna and Tyone lake harvest estimates. Prior to 1984 Louise, Susitna, and Tyone lake harvests were combined.

<sup>b</sup> Includes 1986-1989 average only. No harvest reported prior to 1986.

<sup>c</sup> Includes 1983-1989 average only.

<sup>d</sup> Average of total annual harvest for the years depicted.

the 1979 winter fishery. Anglers were allowed to harvest burbot by fishing multiple hand lines and unattended set lines with no more than a total of 15 hooks plus two hand-held jig hooks. Under these regulations, the sport harvest of burbot from UCUSMA waters increased dramatically, peaking in 1985 when record harvests of 19,355 burbot were taken.

The rapid growth in the fishery raised concern that several UCUSMA burbot stocks were either being, or in imminent danger of becoming, overexploited. In response, in 1987 daily bag limits and the number of hooks an angler could fish in area lakes were reduced to five, whether fished on unattended set-lines or hand held jig-lines. In several road accessible lakes (Lake Louise, Tyone, Susitna, Tolsona, Moose, and Summit lakes), the daily bag and possession limits were further reduced to two fish and anglers were restricted to using only two hooks. Also, the sport fishery for burbot in Hudson Lake was closed by emergency order based on findings that this burbot stock had been severely overexploited and was depressed (Lafferty and Vincent-Lang 1991).

During its 1988 meeting, the Board of Fisheries adopted a management plan for the burbot fisheries in lakes of the UCUSMA. The plan was adopted as regulation (AAC 2002g) to insure that the department had the necessary tools through which to manage the area's lake burbot fishery for *maximum sustained yield and opportunity to participate*. In order to achieve this management objective, the plan gave the department the authority to use time and area closures *and* method and means restrictions to manage the area's lake burbot sport fisheries. In adopting the plan, the BOF stated its desire to not have the bag limits for burbot reduced to less than two for road accessible lakes and five for remote lakes, as it was considered unreasonable by board members to participate in these fisheries at lower bag limits.

Further actions were implemented during 1989 under the newly adopted management plan. An emergency order was issued that closed the burbot fishery in Lake Louise based on research findings that showed the lake's burbot stocks had become severely depressed due to overfishing. In addition, an emergency order was issued to keep the burbot fishery in Hudson Lake closed, as research showed that burbot in this lake remained depleted. Emergency regulations were also enacted that eliminated set-lines from the sport fishery in all remaining lakes of the Tyone River drainage, given that anglers had begun to seek out previously unexploited lakes in the Tyone River drainage in response to restrictions and closures placed on other area lakes (Lafferty and Vincent-Lang 1991). A research program was initiated in 1986 to evaluate the life history of interior Alaska burbot and to determine stock status and sustained yields of burbot fisheries in the UCUSMA. The goal of the research program has been to determine appropriate management strategies that assure the maximum sustained yield of burbot from UCUSMA lakes. The study has been conducted in a variety of lakes. Results to date have provided managers with the tools to determine stock status using a variety of assessment methods and an estimate of the productivity of the area's burbot fisheries. Annual results of the research project are summarized in Lafferty et al. (1990-1992), Lafferty and Bernard (1993), Parker et al. (1987-1989 ), Taube et al. (1994, 2000), and Taube and Bernard (1995, 1999, 2001, *In prep*).

Although the more restrictive regulations greatly reduced harvest in the burbot fisheries of the UCUSMA, managers remained faced with a number of biological and social concerns regarding the management of the area's burbot fisheries. For this reason, managers supported a new approach to the administration of the UCUSMA lake burbot fisheries. Various options were considered; however, managers submitted a proposal to the Board at its 1991 meeting calling for the elimination of *unattended* set lines from all burbot fisheries in the UCUSMA. This proposal



was intended to reduce angler efficiency, thereby providing protection from overexploitation to small burbot stocks in the area. Managers believe this action should assure the long-term opportunity to fish for and harvest burbot in the UCUSMA.

Lake Louise and Hudson Lake were also closed to burbot fishing at the 1991 Board meeting. Both lakes had been closed through emergency orders for the past several years and were expected to be closed through additional emergency orders into the future. A decision was therefore made to close these fisheries through regulation.

Following stock assessment in 1993, the burbot population in Hudson Lake had recovered sufficiently to open the lake to harvest. In the fall, of 1993 Hudson Lake was opened by emergency order, with a bag limit of two burbot. During the 1994 BOF meeting, the department submitted a proposal to reopen Hudson Lake to burbot through regulation. In addition, a proposal to allow limited use of unattended setlines in the Copper River was submitted jointly by ADF&G and the Copper Basin Advisory Committee. The Board of Fisheries approved both recommendations but they could not be implemented due to improper notification of the regulation proposal. The proposals were resubmitted and approved at the BOF meeting in December 1996.

### **Recent Fishery Performance**

With the adoption of the more conservative regulations, harvests of burbot from UCUSMA waters decreased (Table 24). The harvest of 793 burbot during 1991 was the lowest on record. The reduction in harvest has allowed some of the previously overexploited burbot stocks in smaller lakes (e.g., Tolsona, Moose and Hudson lakes) and moderately sized lakes (e.g., Susitna and Paxson lakes) to recover to permit sustainable fisheries. For some lakes, however, these sustainable yields are substantially lower than maximum sustained yields the fisheries are capable of supporting. Larger lakes which were severely overexploited (e.g., Lake Louise) in the early to mid 1980s remain depressed. Stocks in larger lakes take longer to recover from overexploitation than do smaller and moderately-sized lakes. In Lake Louise, historically the largest burbot fishery in Alaska, the burbot stock remains low. The number of mature burbot in this lake, however, has leveled off at 4,000 in recent years (Taube et al. 2000). The current level of burbot abundance in this lake, has remained stable since 1991.

Stock assessment on Tolsona Lake has continued on a yearly basis. Sampling in 1997 indicated a drastic decline in abundance between 1996 and 1997. This was attributed to environmental conditions, summer kill in 1990 and 1991, and possibly in 1992, 1994, 1995, and not a result of overfishing. Closure of the fishery by emergency order occurred in early 1998 (Taube and Bernard 1999). Stock assessment will continue in Tolsona Lake and the fishery will reopen when the population rebuilds to 1,200 mature burbot.

The harvest of 2,290 burbot in 2000 was the highest since 1994. The 2000 harvest was above both the 10-year average and 5-year average harvest. The harvest in 2001 of 1,506 burbot was the lowest since 1998. The 2001 harvest was below the 10-year average, but above the recent 5-year average harvest. It is anticipated the future burbot harvests will remain at current levels.

### **Management Objectives**

Based on the lake burbot management plan (AAC 2002g), the burbot fisheries in lakes of the UCUSMA are to be managed for *maximum sustained yield and opportunity to participate*. In order to achieve this fishery objective, the plan gives the department the authority to use time and area closures *and* method and means restrictions to manage the area's burbot sport fisheries.

Healthy stocks are managed to permit maximum sustained yield while depressed stocks are managed to allow the stocks to rebuild. Fishing is permitted on some depressed stocks, however exploitation levels allow the stocks to rebuild to permit a fishery capable of maximum sustained yield.

The management goal is to develop an orderly fishery. As these fisheries rebuild, it is hoped to provide between 10,000 to 15,000 angler days of ice fishing opportunity with a harvest of about 5,000 burbot on an annual basis in the UCUSMA.

### **Fishery Management**

The majority of burbot fisheries in the UCUSMA are assessed through the SWHS. Several lakes of concern are sampled on a yearly or 3-year rotation. These lakes currently include Tolsona, Hudson, and Lake Louise. Assessment includes estimation of abundance, catch per unit effort (CPUE), and length composition. Tolsona Lake has been assessed annually since 1986, following the population decline in 1996 and 1997 the population is slowly rebuilding, but will remain closed by emergency order until historic population levels are attained. Based upon stock assessment in 2001 and 2002, it does not appear the population will recover to the desired level prior to 2005 (Taube and Bernard *In prep*, Perry-Plake and Bernard *In prep*). As a result, the department has submitted a proposal for the 2002 BOF meeting to close Tolsona Lake by regulation, with the anticipation of submitting a proposal in 2005 to open the lake to burbot fishing.

Lake Louise remains closed by regulation and assessment will be conducted in 2002, prior to the BOF meeting. The population at Lake Louise has maintained its current level of approximately 4,000 burbot since 1989. It appears the population may not rebuild to historic levels, due to competition from the lake trout population (Taube et al. 2000). As the lake has not been open to fishing since 1991, it is not anticipated that continued closure of the fishery will increase abundance. As a result, the department has submitted a proposal for the 2002 BOF meeting to open Lake Louise to sport fishing with a one fish per day bag limit.

### **Fishery Outlook**

Based upon current regulations the harvest of burbot in the UCUSMA should remain stable. Winter weather conditions can dictate ice-fishing effort in a given year; mild winter or late winter conditions can result in increased ice fishing effort. There is increasing snowmachine activity in the UCUSMA each year and undoubtedly some snowmachiners may include ice-fishing in their trips. This may account for the increasing burbot harvest in recent years.

### **Recent Board of Fisheries Actions**

At the BOF meeting in December 1996 the two proposals that had been passed at the 1994 meeting, but nullified due to inadequate public notice, were resubmitted. The first established a personal use fishery for burbot in the mainstem Copper River. Under the authority of the personal use permit, burbot may be taken with unattended set lines from November 1 through April 30. The daily bag and possession limit is five burbot. The department also has the authority to specify in the permit that the carcass be deposited in a collection container or the nearest department office with the harvest data. The second reopened Hudson Lake to burbot fishing with a bag and possession limit of two burbot.

The Copper River Personal Use Burbot Fishery adopted in 1996 during the BOF meeting had seen no participation since its inception. The lack of participation may be a result of limited access to the Copper River and unsafe ice conditions during the open season (November 1 –

April 15). The BOF supported the department proposal at the 1999 BOF meeting to repeal the Personal Use fishery and allow a sport fishery that permits unattended setlines year round on the mainstem Copper River with a bag and possession limit of two burbot. The BOF also supported a second department proposal that reduced the bag and possession limit of burbot from five to two on Tolsona and Moose lakes. This proposal was a result of the recent population declines in Tolsona Lake. There are four proposals submitted to the 2002 BOF meeting regarding UCUSMA burbot fisheries, three by the department and one public proposal. The department proposals address Tolsona Lake and Lake Louise as previously mentioned, and the third requests increasing the bag limit and extending the fishing area for the Copper River set line fishing. The public proposal asks to modify the definition of closely attended in reference to ice fishing lines.

### **Current Issues**

Many anglers have been averse to what they perceive as rapid and drastic changes made to the burbot fisheries of the UCUSMA, and some remain convinced that the actions were unduly restrictive and unfair. This is particularly true with the action taken to eliminate *unattended* set lines from the burbot fisheries of the UCUSMA. Many anglers do not support this action and are choosing to not participate in this fishery because they cannot use this gear type. This reduces participation in fisheries capable of supporting effort and harvest. To promote participation, staff have encouraged anglers to shift to alternative gear types that are legal (attended set lines or tip ups); however, angler participation continues to remain low. The use of unattended setlines in the mainstem of the Copper River was legalized during 1996 but no permits were issued during the three winters the personal use fishery was in effect. There has been minimal harvest on the Copper River since 1999 when the personal use fishery was repealed and two setlines were permitted. Historically, a few anglers using unattended setlines overharvested several UCUSMA burbot populations within a short time. Once overexploited, these fisheries need to be restricted or closed. Given life history characteristics of burbot, recovery of a depressed stock is slow, often taking many years to rebuild to a condition capable of sustaining a fishery. Creation of the lake burbot management plan gave managers the necessary tools to arrest a fishery that had overexploited a burbot stock. However, actions taken under this management plan promote reactive management where the department bears the burden of detecting overexploited stocks with costly assessment programs. This fragments the burbot fisheries of the UCUSMA and leads to regulations that can be confusing due to superseding emergency orders.

### **Ongoing and Recommended Research and Management**

The burbot stock assessment program has resumed on a limited scale. A monitoring program has been proposed that will alternate between Lake Louise and Hudson Lake on a 3-year schedule and Lake Louise was assessed in 1999. Catch-per-unit-effort will be estimated with baited hoop traps to monitor population trends. Research was conducted on Paxson and Sucker lakes in fall 2001 and Susitna Lake in spring 2002 to assess the effectiveness of current regulations (Taube and Bernard *In prep*; Perry-Plake and Bernard *In prep*). The Tolsona Lake population should continue to be sampled for abundance and length composition on a yearly basis, as well as for water quality. The lakes that were assessed during the mid to late 1980's should be revisited to determine if the populations have recovered to historic levels. In addition, baseline data should be collected on the Copper River burbot population. Staff will continue to try to educate the angling public and seek their input to managing these important ice fisheries.

## **WILD RAINBOW AND STEELHEAD TROUT SPORT FISHERIES**

### **Background and Historical Perspective**

The UCUSMA is the northernmost extent of the natural range of rainbow and steelhead trout in North America. Given this, the area's widely distributed stocks of wild rainbow and steelhead trout stocks display generally low and variable production. To assure that these stocks are not overexploited, a conservative regulation package has been developed to manage the fisheries targeting these stocks. This package has been guided by the *Upper Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy*. This policy was adopted by the Board of Fisheries during 1986 and provides the department with:

1. management policies and implementation directives for Copper River basin rainbow and steelhead trout fisheries;
2. a systematic approach to developing sport fishing regulations that includes a process for rational selection of waters for special management such as catch and release, trophy areas, or high yield fisheries; and
3. recommended research activities needed to meet these goals.

Under this policy, the entire Gulkana River drainage has been managed as a catch and release fishery for rainbow and steelhead trout since 1990. Managers believe that the abundance of rainbow/steelhead trout in this drainage is low and that the stocks are incapable of supporting any level of long-term sustainable harvest. Additional protection was provided in 1990 through the establishment of an unbaited, artificial lure only area in all flowing waters of the Gulkana River drainage upstream of an unnamed creek flowing into the Gulkana River 7.5 miles upstream of the confluence of the West Fork. During the 1996 BOF meeting the identified rainbow/steelhead trout spawning areas on the Middle Fork of the Gulkana River were closed to all sport fishing during the adult spawning and egg incubation period of April 15 through June 15. Also in 1996, the retention of rainbow or steelhead trout incidentally taken in the Copper River Personal Use Fishery was prohibited.

The policy has also guided the development of regulations for the Tebay River drainage. In Summit Lake and Bridge Creek in the Tebay drainage, special regulations were established in 1988 to provide anglers the opportunity to harvest a "trophy trout" in the UCUSMA. These regulations stated that rainbow/steelhead trout less than 32 inches in length could not be possessed or retained and the daily bag and possession limit for those over 32 inches was one. Research had once shown that these waters contained the largest nonanadromous rainbow trout in the Copper River drainage, with individual fish measuring over 32 inches in length and weighing up to 20 pounds. However, more recent research (Fleming 2000) reported that only 27% of all rainbow trout sampled (> 3,000 fish) were greater than 12 inches, with a maximum size of 18 in. These results indicate a drastic change in the size composition of this population. As a result, the "trophy trout" regulations were repealed by a department proposal which was adopted at the 1999 BOF meeting to change to a daily bag and possession limit of 10 per day, maximum size limit of 12 inches, and an open season of July 1 through May 31.

The waters of Lower Hanagita Lake and the Hanagita River from Lower Hanagita Lake to the Tebay River have been managed as a catch-and-release fishery since 1988. In all these waters, only unbaited, artificial lures have been permitted. This special regulation was adopted in 1988 to afford additional protection to these stocks. Research conducted by Fleming (1999), indicated

a smaller than previously thought spawning population. This resulted in a department proposal, which was adopted at the 1999 BOF meeting, to extend the catch and release only regulations to the entire Hanagita River drainage and the portion of the Tebay River drainage downstream of its confluence with the Hanagita River.

All other waters supporting wild rainbow/steelhead trout stocks are managed under a two fish daily and two fish possession limit of which only one fish may be over 20 inches. The season is year-round with the exception of the Middle Fork Gulkana River spawning closure of April 15 through June 15 and Bessie and Our creeks (tributaries to Moose Lake), which are closed from May 5 through June 15 to protect, spawning grayling. Under this regulation package, the harvest of wild rainbow and steelhead trout has been lowered.

### **Recent Fishery Performance**

An estimated 331 wild rainbow trout were harvested in 2000, which was 65% less than the 1990-1999 average of 945 fish harvested (Table 26). The catch of wild rainbow for 2000 was estimated at 10,292, which is 11% above the 1990-1999 average catch of 9,152 (Table 27). An estimated 452 wild rainbow trout were harvested in 2001, which was 52% less than the 1990-1999 average of 945 fish harvested (Table 26). The catch of wild rainbow for 2001 was estimated at 6,342, which is 31% below the 1990-1999 average catch of 9,152.

No steelhead trout were reported harvested in 2000 or 2001 (Table 28). The 346 steelhead caught in 2000 was the largest number caught in the UCUSMA on record (Table 29). The 2001 catch of 234 trout was the fourth largest on record. Historically, the Gulkana River drainage represents the largest proportion of steelhead catch in the UCUSMA. Historic trends in the area's wild rainbow/steelhead fishery are difficult to ascertain, as annual harvest and catch estimates have been small and have fluctuated substantially.

### **Management Objectives**

The wild rainbow trout and steelhead populations are managed under the guidelines outlined in the *Upper Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy*.

### **Fishery Management**

In 1998, the first directed assessment by the department of wild rainbow trout and steelhead trout was conducted on the Gulkana River (Fleming 1999). Length, age and genetic data were gathered from both rainbow trout and steelhead within the spawning area on the Middle Fork and mainstem Gulkana. In 1999, the Middle Fork spawning areas were sampled again and aerial surveys of the West Fork were conducted to locate other spawning areas (Fleming 2000). In addition, Fleming (2000) sampled Summit Lake in the Tebay drainage for abundance, age and length composition, and water quality. These studies were conducted to provide data regarding proposals submitted by the department for the 1999 BOF meeting. These proposals addressed several fishery regulations and offered replacement language so that the UCUSMA regulations regarding rainbow and steelhead trout would comply with the *Upper Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy*.

### **Fishery Outlook**

With the passage of the department submitted proposals in 1999, it is anticipated that the harvests of rainbow and steelhead trout will remain stable or decline slightly from the historic

**Table 26.-Harvest of wild rainbow trout by sport anglers fishing UCUSMA waters by drainage, averaged for 1977 – 1989 and annually from 1990 to 2001.**

Areas	1977-89	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>c</sup>	1995-1999 <sup>c</sup>
<b>Gulkana River Drainage<sup>a</sup></b>															
Upper River	791 <sup>c</sup>	204	14	0	0	0	0	0	0	0	0	0	0	22	0
Lower River	151 <sup>c</sup>	34	0	0	0	0	0	0	0	0	0	0	0	3	0
Gulkana River other	450 <sup>c</sup>	187	150	8	40	0	0	0	0	0	0	0	0	39	0
<b>Total</b>	<b>1,392<sup>c</sup></b>	<b>425</b>	<b>164</b>	<b>8</b>	<b>40</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>64</b>	<b>0</b>
<b>Klutina River Drainage</b>	104 <sup>c</sup>	17	96	63	108	8	37	0	12	8	0	0	81	35	11
<b>Tazlina Drainage</b>	35 <sup>c</sup>	170	0	24	0	8	0	10	36	48	73	0	0	37	33
<b>Tonsina Drainage</b>	103 <sup>c</sup>	17	14	103	40	87	28	26	0	8	24	33	0	35	17
<b>Copper River</b>															
Upstream of Gulkana	27 <sup>c</sup>	68	68	0	0	0	0	0	0	0	0	0	0	14	0
Downstream of Klutina <sup>d</sup>	113 <sup>c</sup>	17	109	214	0	515	94	148	132	176	117	0	56	152	133
<b>Other Sites</b>	816	662	177	681	730	981	225	892	955	203	584	298	315	609	572
<b>Area Total</b>	<b>2,976<sup>b</sup></b>	<b>1,376</b>	<b>628</b>	<b>1,093</b>	<b>918</b>	<b>1,599</b>	<b>384</b>	<b>1,076</b>	<b>1,135</b>	<b>443</b>	<b>798</b>	<b>331</b>	<b>452</b>	<b>945</b>	<b>767</b>

<sup>a</sup> In 1991, the river was closed to the harvest of rainbow trout.

<sup>b</sup> Includes average of entire drainage.

<sup>c</sup> Includes 1983-1989 average harvest only. Prior to 1983, this harvest was included in the listing for “Other waters” in the SWHS report.

<sup>d</sup> Not including Tonsina drainage.

<sup>e</sup> Average of total annual harvest for the years depicted.

**Table 27.-Catch of wild rainbow trout by sport anglers fishing UCUSMA waters by drainage, annually from 1990 to 2001.**

Areas	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>b</sup>	1995-1999 <sup>b</sup>
<b>Gulkana River Drainage<sup>a</sup></b>														
Upper River	2,344	1,256	1,496	2,468	3,088	3,397	5,140	7,816	3,429	5,699	5,354	2,815	<b>3,613</b>	<b>5,096</b>
Lower River	51	14	166	305	149	495	1,371	199	1,317	1,743	1,281	962	<b>581</b>	<b>1,025</b>
Gulkana River other	0	0	0	0	143	66	183	99	682	261	194	383	<b>143</b>	<b>258</b>
<b>Total</b>	<b>2,395</b>	<b>1,270</b>	<b>1,662</b>	<b>2,773</b>	<b>3,380</b>	<b>3,958</b>	<b>6,694</b>	<b>8,114</b>	<b>5,428</b>	<b>7,703</b>	<b>6,829</b>	<b>4,160</b>	<b>4,338</b>	<b>6,379</b>
<b>Klutina River Drainage</b>	34	246	103	958	95	37	42	53	8	23	267	256	<b>160</b>	<b>33</b>
<b>Tazlina River Drainage</b>	645	792	253	99	207	0	10	125	48	108	0	0	<b>229</b>	<b>58</b>
<b>Tonsina River Drainage</b>	17	41	293	98	290	234	26	0	25	83	78	36	<b>111</b>	<b>74</b>
<b>Copper River</b>														
Upstream of Gulkana	509	342	0	79	161	0	0	0	0	128	0	0	<b>122</b>	<b>26</b>
Downstream of Klutina	153	109	1,908	663	3,454	1,233	1,584	3,062	4,993	553	1,496	767	<b>1,771</b>	<b>2,285</b>
<b>Other Sites</b>	2,768	1,106	2,581	1,954	4,926	1,247	2,389	4,988	557	1,706	1,622	1,123	<b>2,422</b>	<b>2,177</b>
<b>Area Total</b>	<b>6,521</b>	<b>3,906</b>	<b>6,800</b>	<b>6,624</b>	<b>12,513</b>	<b>6,709</b>	<b>10,745</b>	<b>16,342</b>	<b>11,059</b>	<b>10,304</b>	<b>10,292</b>	<b>6,342</b>	<b>9,152</b>	<b>11,032</b>

<sup>a</sup> In 1991, the river was closed to the harvest of rainbow trout.

<sup>b</sup> Average of total annual catch for the years depicted.

**Table 28.-Harvest of steelhead trout by sport anglers fishing UCUSMA waters by drainage, averaged for 1977 – 1989 and annually from 1990 to 2001.**

Areas	1977-89	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>c</sup>	1995-1999 <sup>c</sup>
<b>Gulkana River Drainage<sup>a</sup></b>															
Upper River	10	0	0	0	0	0	10	0	0	0	0	0	0	1	2
Lower River	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulkana River other	18	34	0	8	0	0	0	0	0	0	0	0	0	4	0
<b>Total</b>	<b>33</b>	<b>34</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>2</b>
<b>Tazlina River Drainage</b>	0 <sup>b</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Klutina River Drainage</b>	0 <sup>b</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Tonsina River Drainage</b>	0 <sup>b</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Copper River</b>															
Upstream of Gulkana	0 <sup>b</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Downstream of Klutina	0 <sup>b</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Other Sites</b>	<b>48</b>	<b>0</b>	<b>114</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>2</b>
<b>Area Total</b>	<b>83<sup>c</sup></b>	<b>34</b>	<b>114</b>	<b>8</b>	<b>0</b>	<b>7</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>18</b>	<b>4</b>

<sup>a</sup> In 1991, the river was closed to the harvest of steelhead trout.

<sup>b</sup> Includes 1983-1989 average harvest only. Prior to 1983, this harvest was included in “Other waters” in the SWHS report.

<sup>c</sup> Average of total annual harvest for the years depicted.



**Table 29.-Catch of steelhead trout by sport anglers fishing UCUSMA waters by drainage, annually from 1990 to 2001.**

Areas	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>b</sup>	1995-1999 <sup>b</sup>
<b>Gulkana River Drainage<sup>a</sup></b>														
Upper River	68	26	31	92	0	43	36	23	23	136	121	116	<b>48</b>	<b>52</b>
Lower River	0	0	8	10	0	8	85	54	82	120	36	103	<b>37</b>	<b>70</b>
Gulkana River other	0	0	0	0	0	0	0	49	4	0	12	0	<b>5</b>	<b>11</b>
<b>Total</b>	<b>68</b>	<b>26</b>	<b>39</b>	<b>102</b>	<b>0</b>	<b>51</b>	<b>121</b>	<b>126</b>	<b>109</b>	<b>256</b>	<b>169</b>	<b>219</b>	<b>90</b>	<b>133</b>
<b>Tazlina River Drainage</b>	0	0	0	0	0	0	0	0	0	0	0	0	<b>0</b>	<b>0</b>
<b>Klutina River Drainage</b>	0	0	0	0	0	0	0	0	0	0	0	15	<b>0</b>	<b>0</b>
<b>Tonsina River Drainage</b>	0	0	0	0	212	0	0	0	0	0	0	0	<b>21</b>	<b>0</b>
<b>Copper River</b>														
Upstream of Gulkana	0	0	0	0	0	0	0	0	0	0	0	0	<b>0</b>	<b>0</b>
Downstream of Klutina	0	0	0	0	113	0	0	0	87	0	177	0	<b>20</b>	<b>17</b>
<b>Other Sites</b>	68	114	0	0	7	0	0	0	0	8	0	0	<b>20</b>	<b>2</b>
<b>Area Total</b>	<b>136</b>	<b>140</b>	<b>39</b>	<b>102</b>	<b>332</b>	<b>51</b>	<b>121</b>	<b>126</b>	<b>196</b>	<b>264</b>	<b>346</b>	<b>234</b>	<b>151</b>	<b>152</b>

<sup>a</sup> In 1991, the river was closed to the harvest of steelhead trout.

<sup>b</sup> Average of total annual catch for the years depicted.

average. These actions will protect existing stocks and allow those that may be depleted to recover and provide the opportunity to catch rainbow and steelhead trout.

### **Recent Board of Fisheries Actions**

Several changes to the UCUSMA rainbow and steelhead trout regulations were approved at the December 1999 BOF meeting. A new regulation providing additional protection, permits the use of only unbaited, single hook, artificial lures in all flowing waters of the UCUSMA, with the exception of the Klutina River drainage and other drainages specifically listed in the regulations. The entire Hanagita River drainage and the portion of the Tebay River drainage downstream of its confluence with the Hanagita River became catch and release only for rainbow and steelhead trout. This change provided consistency in the drainage regulations and provided additional protection to the small steelhead spawning population in the Hanagita River. The final change applies to Summit Lake in the Tebay River drainage, where the bag and possession limit became 10 per day, with a maximum size limit of 12 in. This action is taken to re-establish large rainbow trout in Summit Lake. A department proposal has been submitted to the 2002 BOF meeting to close Twelve Mile Creek, a tributary of the Gulkana River, from April 15-June 15 to protect spawning rainbow trout and steelhead trout. This proposal was submitted as a result of research conducted during 2000-2001 to locate rainbow trout spawning areas in the Gulkana River (Fleming *In prep*).

### **Current Issues**

Public concern over poor stock condition and no rainbow trout greater than 20 inches in the trophy fishery at Summit Lake has increased during recent years. Stock assessment in this system to determine if this is the case was conducted in 1999 and a proposal was passed at the 1999 BOF to allow a liberal harvest of small stunted rainbow trout to encourage growth of large fish. If this regulation, in itself, does not provide additional harvest, the department has examined alternative methods of fish removal to encourage larger size rainbow trout in the population. Catch was reported at Summit Lake in 2000, but no harvest was reported. Neither harvest nor catch were reported at Summit Lake in 2001. The department is developing a project to reduce the population density of rainbow trout, the implementation of this project hinges on approval of the Fish Transport Permit to outstock the fish to stocked lakes on the McCarthy Road and a permit from the National Park Service to establish a field camp to conduct the work within the Wrangell-St. Elias National Park boundaries.

### **Ongoing and Recommended Research and Management Activities**

Two rainbow/steelhead trout projects were conducted during 2000 in the UCUSMA (Fleming *In prep*). Both of these were conducted on the Gulkana River. Preliminary work for establishing a weir site on the Middle Fork downstream of Dickey Lake to enumerate rainbow trout and steelhead spawners was conducted in spring 2000. The second involved the radio-tagging of resident rainbow trout in the Gulkana River drainage to locate spawning grounds. Rainbow trout over 20 inches in length were captured and implanted with radio-tags during the summer of 2000 and then tracked during spring 2001 to locate new spawning areas. In spring 2001, the weir was installed downstream of Dickey Lake and operated throughout the spawning period. In fall 2001, a weir was installed at Hanagita Lake in the Tebay River drainage to enumerate migrating steelhead. Both weir projects continued in 2002.

A research plan should be developed for assessment of new areas of potential concern or creating and/or expanding existing databases on rainbow/steelhead trout populations in the UCUSMA. A steelhead trout distribution study could be conducted coincidentally with the current chinook salmon study to collect distribution data.

## **DOLLY VARDEN SPORT FISHERIES**

### **Background and Historical Perspective**

Dolly Varden is a popular sport fish species in the UCUSMA, particularly among local residents fishing in the Klutina and Tonsina river drainages. Populations, both resident and anadromous, are found throughout the upper Copper River drainage. Dolly Varden are not present in the Gulkana River drainage, no juvenile or adult fish have been captured during any of the department stock assessment projects on the river. A single report of a Dolly Varden caught through the ice in the lower river during the 1999/2000 winter, is the only documentation of any Dolly Varden in the Gulkana River. Dolly Varden occur upstream of the Gulkana River, in the Chitina River drainage, and in drainages downstream of the Gulkana River. There is no explanation as to why this species is not present in the Gulkana River. Based upon harvest and catch reports from the SWHS, a minor harvest occurs in the upper Susitna River drainage, though due to the barrier at Devils Canyon it is believed these are resident populations. There is limited knowledge regarding the Dolly Varden populations in the UCUSMA, there has been only one project directed towards this species. A University of Alaska – Fairbanks graduate study, co-funded by ADF&G, BLM and the Alaska Cooperative Fishery Research Unit (ACFRU), was conducted on the Tiekkel and Little Tonsina rivers in 1985 and 1986 (Gregory 1988). This study documented the biological characteristics of Tiekkel River Dolly Varden and compared these to the characteristics of a sample of Little Tonsina River Dolly Varden.

There has been a directed sport fishery in the Klutina and Tonsina river drainages for Dolly Varden. These occur primarily in the Little Tonsina River and the upper Klutina River near the outlet of the lake, generally before the chinook salmon fishery begins in late June and after the chinook salmon fishery closes at the end of July. Harvests of Dolly Varden in the UCUSMA, since the inception of the SWHS in 1977, have ranged from 904 fish in 1978 to 6,001 in 1985. In 1985, 51% and 34% of the UCUSMA harvest occurred in the Klutina and Tonsina river drainages. The bag and possession limit for Dolly Varden has been at 10 per day and 10 in possession since at least the early 1970's. Creel surveys were conducted on the Klutina River in 1988 and 1989, but no data on Dolly Varden harvests were collected, as the creel surveys were directed at estimating chinook and sockeye harvests (Roth and Delaney 1989, Potterville and Webster 1990).

### **Recent Fishery Performance**

Harvests of Dolly Varden prior to 1983 were not separated by individual systems in the SWHS. From 1983 to 1989, harvests averaged 4,451 fish, the Klutina and Tonsina rivers accounted for 54% and 24% of the UCUSMA harvest during this period, respectively (Table 30). From 1990 to 1999, UCUSMA harvests averaged 2,113 fish, the Klutina and Tonsina river harvests contributing 61% and 18% to the harvest total during this period. The harvest trends are declining, with the harvest of 934 in 2000, the lowest since 1978. The 2001 harvest of 1,569 was the highest since 1999. The decline in harvest in 2000 is likely due to the high water conditions on the Klutina River that occurred during most of the fishing season.

**Table 30.-Harvest of Dolly Varden by sport anglers fishing UCUSMA waters by drainage, averaged for 1983 – 1989 and annually from 1990 to 2001.**

Areas	1983-89	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-1999 <sup>b</sup>	1995-1999 <sup>b</sup>
<b>Klutina River Drainage</b>	2,417	2,156	1,448	1,294	1,818	1,250	712	838	549	1092	1818	257	644	<b>1,298</b>	<b>1,002</b>
<b>Tazlina Drainage</b>	141	476	0	57	26	11	44	0	0	16	22	0	54	<b>65</b>	<b>16</b>
<b>Tonsina Drainage</b>	1,045	459	179	630	689	216	500	462	107	98	363	498	795	<b>370</b>	<b>306</b>
<b>Copper River</b>															
Upstream of Gulkana	197	0	26	0	106	56	66	1,043	135	0	32	0	0	<b>146</b>	<b>255</b>
Downstream of Klutina <sup>a</sup>	58	0	154	0	0	9	48	24	44	16	45	102	11	<b>34</b>	<b>35</b>
<b>Other Sites</b>	666	34	90	16	534	56	325	208	257	367	110	77	65	<b>200</b>	<b>253</b>
<b>Area Total</b>	<b>4,451<sup>b</sup></b>	<b>3,125</b>	<b>1,897</b>	<b>1,997</b>	<b>3,173</b>	<b>1,598</b>	<b>1,695</b>	<b>2,575</b>	<b>1,092</b>	<b>1,589</b>	<b>2,390</b>	<b>934</b>	<b>1,569</b>	<b>2,113</b>	<b>1,868</b>

<sup>a</sup> Not including Tonsina drainage.

<sup>b</sup> Average of total annual harvest for the years depicted.

### **Management Objectives**

There are currently no specific management objectives for Dolly Varden. The underlying goal of the department, however, has been to assure sustained yield and provide fishing opportunity on fish resources.

### **Fishery Management**

The Dolly Varden fisheries of the UCUSMA are assessed through the SWHS.

### **Fishery Outlook**

With little biological or stock assessment data on the Dolly Varden stocks of the UCUSMA, it is uncertain whether the recent decline in harvests is a result of stock decline or reduced fishing effort. The SWHS does not distinguish effort between individual species, but in the Klutina River sport fisheries, it is assumed that most effort is directed at chinook salmon. The recent regulatory restrictions towards chinook salmon in the Tonsina River may have resulted in effort shifting towards other species, such as Dolly Varden or Arctic grayling. Without a creel survey to assess the proportion of effort directed at individual species, the current effort data denotes drainage or system trends only. If fishing effort in the UCUSMA as a whole increase, it is anticipated that Dolly Varden harvest will increase also.

### **Recent Board of Fisheries Action**

As a result of biological concern regarding the Tonsina River chinook salmon stock in recent years the use of bait was restricted and only unbaited, single hook, artificial lures were permitted following the 1996 BOF meeting. At the March 1999 BOF meeting, the bait restriction was modified to allow bait to be used with a hook gap of 3/8 inch or less. This regulatory modification was made to permit fisheries for Dolly Varden and Arctic grayling in the Tonsina River using traditional gear to harvest these species, while still reducing the harvest of chinook salmon.

### **Current Issues**

There is a lack of biological and stock data for UCUSMA Dolly Varden populations. It is not known whether both resident and anadromous populations exist within individual systems. It is assumed, based upon the observed size of Dolly Varden harvested from the Klutina and Tonsina river drainages, that these fish are anadromous Dolly Varden. In addition, there is no data, aside from the SWHS, and auxiliary data from the CWT chinook salmon project and lake and stream evaluation data from the 1960's and 1970's, on distribution of Dolly Varden in the UCUSMA. Based upon harvest and catch data from the SWHS, there is a significant fishery for Dolly Varden in the UCUSMA and a need for data concerning these exploited stocks.

### **Ongoing and Recommended Research and Management**

Since there is a lack of baseline data on Dolly Varden stocks, future research projects in the UCUSMA that may capture Dolly Varden should record biological data for incorporation into an area database. If creel surveys are conducted on the Klutina or Tonsina rivers for chinook or sockeye salmon, otoliths should be collected for microprobe analysis from any Dolly Varden that may be sampled. This will determine if the fish are anadromous or resident. Creel surveys will also provide data on fishing effort directed toward Dolly Varden.

### **UPPER COPPER / UPPER SUSITNA MANAGEMENT AREA SPORT FISHERY ENHANCEMENT**

The Alaska Department of Fish and Game stocks about 30 lakes in the upper Susitna River drainage and the upper Copper River drainage management area (UCUSMA) to provide fishing

opportunities for popular game species in locations where fishing opportunities don't exist or are limited. The lake stocking program serves a segment of the public who want to fish but must remain on or near the road system. This program provides increased fishing opportunities and offers a diversity of species in rural areas where minimal or no opportunities exist for sportfishing. It also diverts effort from wild populations in areas for which the department has conservation concerns. These lakes vary in size from 1.5 to 500 acres.

The ADF&G stocks fingerling size fish (2-4 inches) in some lakes and catchable size fish (6 to 12 inches) in other lakes. Most large lakes can produce sufficient numbers of catchables from stockings of fingerling to meet angler demand. Smaller lakes or the more popular large lakes are stocked with catchables because stockings of fingerlings can not provide sufficient numbers of catchables to meet angler demand. Catchables are stocked as soon as the ice is gone, helping to accommodate angler enthusiasm for spring fishing.

Daily bag and possession limits for stocked fish in lakes are:

Species	Daily Bag and Possession Limit	Size Limit
Rainbow trout	10	Only 1 over 20 inches
Arctic grayling	10	No size limit
Silver salmon	10	Less than 16 inches
King salmon	10	Less than 20 inches
Arctic char	10	No size limit
Lake trout	2	No size limit

### Objectives

1. Manage important endemic fish populations, when present, according to sustained yield principles.
2. Provide a minimum of 5,000 angler-days of sport fishing effort.
3. Provide sport angling diversity by stocking a mix of game fish.
4. Publicize and promote the fishing opportunities available to anglers.
5. Improve public access where needed.

### Actions

Fish stockings for specific lakes are listed in Table 31. Fish stockings for 2000 - 2002 are summarized in Table 32 and projected fish stockings for 2003 and 2004 are summarized in Table 33.

### Evaluations

1. Sport fishing effort and harvest will be estimated through the Statewide Harvest Survey.
2. Population status may be assessed by periodic on-site sampling or as a component of research projects.

**Table 31.-Stocking schedule for remote lakes in the UCUSMA.**

Area (Access)Lake	Lake Size in Acres	Species	Stocking Years
<b>Glenn Highway</b>			
Arizona Lake	25	Grayling	Alternate
Buffalo Lake	4	Rainbow	Annual
DJ Lake	4	Rainbow	Alternate
Gergie Lake	60	Rainbow	Alternate
John Lake	160	Arctic Char	Alternate
Little Junction Lake	5	Grayling	Alternate
Ryan Lake	45	Rainbow	Annual
Tex Smith Lake	15	Rainbow	Annual
<b>Richardson Highway</b>			
Dick Lake	40	Arctic Char	Alternate
Pippin Lake	160	Rainbow	Annual
Squirrel Creek Pit	5	Grayling, Rainbow	Annual, Annual
<b>Lake Louise Road</b>			
Connor Lake	18	Grayling	Alternate
Crater Lake	16	Rainbow	Alternate
Junction Lake	18	Grayling	Alternate
Little Crater Lake	2	Rainbow	Alternate
Old Road Lake	1.5	Rainbow	Annual
Peanut Lake	12	Rainbow	Alternate
Round Lake	2	Rainbow	Annual
<b>Edgerton Highway</b>			
Three Mile Lake	20	Rainbow	Alternate
Two Mile Lake	17	Rainbow	Alternate
<b>McCarthy Road</b>			
Sculpin Lake	190	Rainbow	Annual
Silver Lake	500	Rainbow	Annual
Strelna Lake	290	Coho, Rainbow	Annual, Alternate
Van Lake		Rainbow	Alternate
<b>Remote Lakes</b>			
North Jans Lake	58	Rainbow	Alternate
South Jans Lake	100	Coho, Rainbow	Annual, Alternate
Tolsona Mt. Lake	75	Rainbow	Alternate

**Table 32.-Summary of stocking activities for stocked lakes in the UCUSMA 2000-2002.**

Species	Catchable	Subcatchable	Fingerling	Total
<b>2000</b>				
Arctic Char	1,521			1,521
Arctic Grayling	7,562			7,562
Rainbow Trout	7,179			7,179
Coho Salmon			35,938	35,938
Total	<b>16,262</b>		<b>35,938</b>	<b>52,200</b>
<b>2001</b>				
Arctic Char				
Arctic Grayling	4,716			4,716
Rainbow Trout	15,228		185,000	200,228
Coho Salmon				
Total	<b>19,944</b>		<b>185,000</b>	<b>204,944</b>
<b>2002</b>				
Arctic Char			4,000	4,000
Arctic Grayling				
Rainbow Trout	10,354			10,354
Coho Salmon			34,000	34,000
Total	<b>10,354</b>		<b>38,000</b>	<b>48,354</b>



**Table 33.-Summary of projected game fish stockings for small remote lakes in the UCUSMA, 2003-2004 (these numbers are dependent on hatchery production).**

Number of Lakes 2003/2004	Species	Lifestage	Target Size (in)	2003 Projected	2004 Projected
1/1	Arctic Char	Catchable	6-8	2,000	2,000
1/1	Coho Salmon	Fingerling	2-4	20,000	34,000
1/6	Arctic Grayling	Catchable	6-8	800	2,900
9/9	Rainbow Trout	Catchable	6-8	12,450	12,450
4/8	Rainbow Trout	Fingerling	2-4	123,000	62,000

### **Fishery Statistics**

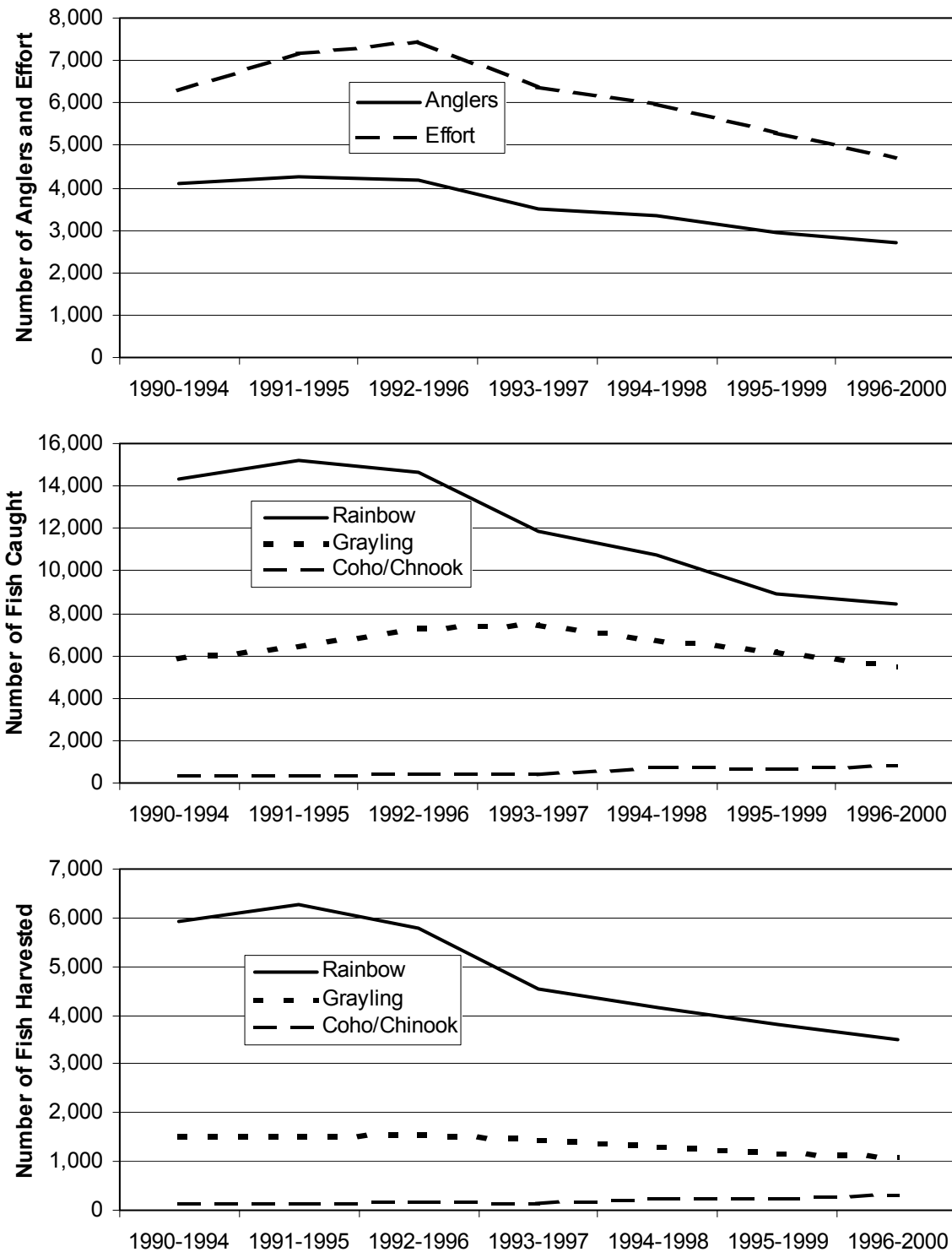
During the period 1991 through 2000, the annual effort on stocked species ranged from 3,232 to 8,647 angler-days and averaged about 5,933 angler-days (Table 34). Five-year moving averages from 1990 through 2000, for number of anglers, effort, catch and harvest are shown in Figure 16. Since 1991, 64% of the catch and 75% of the harvest of stocked game fish was made up of rainbow trout. Arctic grayling and coho and chinook salmon contribute 33% and 3% to catch and 21% and 4% to harvest, respectively (Figure 17). Average annual effort per surface acre for stocked species was about 2.7 angler-days. The average catch rate for stocked fish in the UCUSMA was about 3.2 fish per angler-day of effort. Average annual cost of producing and stocking fish was \$35,548 while the annual cost-per-day of fishing averaged \$7.31 and the cost-per-day of fishing averaged \$2.34.

Of all the stocked lakes in the UCUSMA, Silver Lake is the most popular. Since 1991, it accounted for about 35% of the anglers and angler-days of effort generated on stocked waters. It also accounted for 44% of the catch and 38% of the harvest of all stocked fish.

**Table 34.-Effort, harvest, and catch statistics by species for stocked lakes in the UCUSMA 1991-2000.**

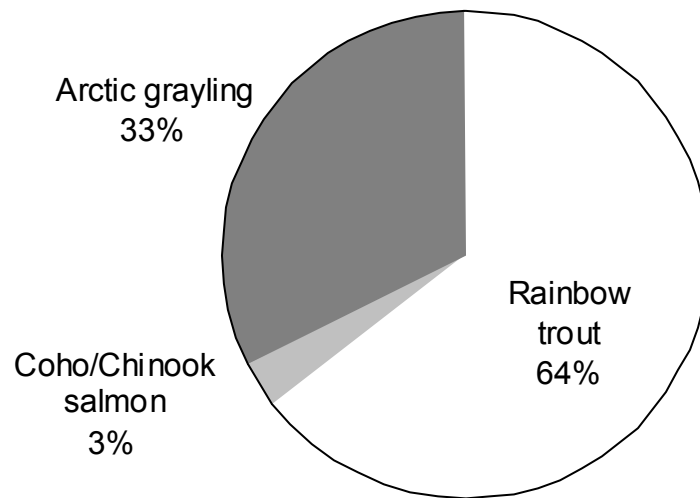
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>Effort</b>										
Number of Anglers <sup>a</sup>	3,716	5,758	3,956	4,053	3,893	3,290	2,395	3,006	2,184	2,585
Number of Days Fished (effort)	5,035	8,647	6,161	7,945	8,122	6,316	3,232	4,216	4,666	4,995
<b>Catch</b>										
Rainbow trout	10,772	21,910	17,418	14,814	11,058	8,043	8,144	11,781	5,529	8,769
Coho Salmon	389	670	56	550	109	611	607	1,593	333	800
Lake Trout	2,136	5,764	6,735	9,182	8,569	6,394	6,444	3,260	6,254	5,170
Total	13,297	28,344	24,209	24,546	19,736	15,048	15,195	16,634	12,116	14,739
Catch rate (catch / effort)	2.6	3.3	3.9	3.1	2.4	2.4	4.7	3.9	2.6	3.0
<b>Harvest</b>										
Rainbow trout	6,308	8,723	6,795	5,109	4,355	3,947	2,512	4,942	3,370	2,704
Coho Salmon	111	433	56	134	42	225	315	412	249	436
Lake Trout	794	1,969	1,186	2,324	1,429	971	1,405	489	1,521	1,237
Total	7,213	11,125	8,037	7,567	5,826	5,143	4,232	5,843	5,140	4,377

<sup>a</sup> Estimates of the numbers of anglers in this table are inflated because some anglers fish at more than one location. As a result, they are counted more than once.

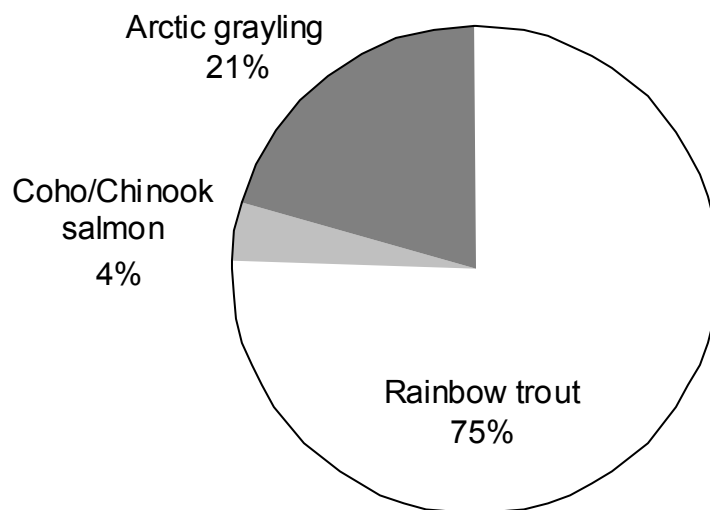


**Figure 16.-Five-year moving averages for fishing effort (angler-days) and number of fish caught and harvested from stocked lakes in the UCUSMA 1990-2000.**

### Catch



### Harvest



**Figure 17.-Ten year average catch and harvest composition by species for all stocked lakes in the UCUSMA, 1991-2000.**

## LITERATURE CITED

- AAC (Alaska Administrative Code). 1996. 5 AAC 77.590. In Alaska Administrative Code, Title 5, Fish and Game. Pamphlet 2, Register 139, October 1996. Michie Law Publishers, Charlottesville, VA.
- AAC (Alaska Administrative Code). 1999. 5 AAC 77.590. In Alaska Fish and Game Laws and Regulations Annotated 1999-2000 Edition. Lexis Publishing, NY.
- AAC (Alaska Administrative Code). 2002. Alaska Fish and Game Laws and Regulations Annotated 2002-2003 Edition. Lexis Publishing, NY.
- AAC (Alaska Administrative Code). 2002a. 5 AAC 75.003. In Alaska Fish and Game Laws and Regulations Annotated 2002-2003 Edition. Lexis Publishing, NY.
- AAC (Alaska Administrative Code). 2002b. 5 AAC 24.360. In Alaska Fish and Game Laws and Regulations Annotated 2002-2003 Edition. Lexis Publishing, NY.
- AAC (Alaska Administrative Code). 2002c. 5 AAC 24.361. In Alaska Fish and Game Laws and Regulations Annotated 2002-2003 Edition. Lexis Publishing, NY.
- AAC (Alaska Administrative Code). 2002d. 5 AAC 01.647. In Alaska Fish and Game Laws and Regulations Annotated 2002-2003 Edition. Lexis Publishing, NY.
- AAC (Alaska Administrative Code). 2002e. 5 AAC 52.045. In Alaska Fish and Game Laws and Regulations Annotated 2002-2003 Edition. Lexis Publishing, NY.
- AAC (Alaska Administrative Code). 2002f. 5 AAC 77.001. In Alaska Fish and Game Laws and Regulations Annotated 2002-2003 Edition. Lexis Publishing, NY.
- AAC (Alaska Administrative Code). 2002g. 5 AAC 52.045. In Alaska Fish and Game Laws and Regulations Annotated 2002-2003 Edition. Lexis Publishing, NY.
- Barnhart, G. A. and R. Engstrom-Heg. 1984. A synopsis from New York experiences with catch and release management of wild salmonids. Pages 91-101 in F. Richardson and R. H. Hamre, eds. Wild trout III, Proceedings of the Symposium. Yellowstone National Park, September 1984.
- Bosch, D. E. 1995. Population dynamics and stock assessment of Arctic grayling (*Thymallus arcticus*) in the Gulkana River drainage, Alaska. Master's thesis, University of Alaska Fairbanks.
- Brady, J. A., S. Morstad, and E. Simpson. 1991. Review of Prince William Sound area commercial salmon fisheries, 1990. Alaska Department of Fish and Game, Regional Information Report No. 2C91-02, Anchorage.
- Burr, John M. 1987. Synopsis and bibliography of lake trout (*Salvelinus namaycush*) in Alaska. Alaska Department of Fish and Game, Fishery Manuscript No. 5, Juneau.
- Butorac, M. 2002. Personal communication. Bureau of Land Management, Glennallen District.
- Evans, D. O., J. M. Casselman, and C. C. Willox. 1991. Effects of exploitation, loss of nursery habitat, and stocking on the dynamics and productivity of lake trout populations in Ontario lakes. Lake Trout Synthesis, Ontario Ministry Natural Resources, Toronto.
- Evenson, M. and K. Wuttig. 2000. Inriver abundance, spawning distribution and migratory timing of Copper River chinook salmon in 1999. Alaska Department of Fish and Game, Fishery Data Series No. 00-32, Anchorage.
- Fish, J. T. and S. M. Roach. 1999. Evaluation of the Arctic grayling stock in the Gulkana River, 1998. Alaska Department of Fish and Game, Fishery Data Series No. 99-28, Anchorage.
- Fleming, D. F. 1999. Surveys and stock monitoring of rainbow and steelhead trout in the upper Copper River drainage during 1998. Alaska Department of Fish and Game, Fishery Data Series No. 99-37, Anchorage.
- Fleming, D. F. 2000. Stock assessment of rainbow trout in Summit Lake and surveys of rainbow and steelhead trout in the Gulkana River drainage, 1999. Alaska Department of Fish and Game, Fishery Data Series No. 00-33, Anchorage.

## LITERATURE CITED (Continued)

- Fleming, D. F. *In prep.* Stock assessment of rainbow trout and steelhead trout in the Gulkana River drainage and steelhead in the Hanagita River drainage, 2001. Alaska Department of Fish and Game, Fishery Data Series No. XX-XX, Anchorage.
- Gryska, A. *In prep.* Stock assessment of Arctic grayling in the Gulkana River drainage, 2002. Alaska Department of Fish and Game, Fishery Data Series, Anchorage.
- Gregory, S. L. 1988. Population characteristics of Dolly Varden in the Tiekkel River, Alaska. Master's thesis, University of Alaska Fairbanks.
- Hicks, F. and N. Quinn. 1990. Lake trout slot size limit regulations, Algonquin Park. Progress Report, Experimental Management Project. Ontario Ministry Natural Resources, Toronto.
- Howe, A. L., G. Fidler, and M. J. Mills. 1995. Harvest, catch, and participation in Alaska sport fisheries during 1994. Alaska Department of Fish and Game, Fishery Data Series No. 95-24, Anchorage.
- Howe, A. L., G. Fidler, A. E. Bingham, and M. J. Mills. 1996. Harvest, catch, and participation in Alaska sport fisheries during 1995. Alaska Department of Fish and Game, Fishery Data Series No. 96-32, Anchorage.
- Howe, A. L., R. J. Walker, C. Olnes, K. Sundet, and A. E. Bingham. 2000a. Harvest, catch, and participation in Alaska sport fisheries during 1996. Alaska Department of Fish and Game, Fishery Data Series No. 97-29 (Revised), Anchorage.
- Howe, A. L., R. J. Walker, C. Olnes, K. Sundet, and A. E. Bingham. 2000b. Harvest, catch, and participation in Alaska sport fisheries during 1997. Alaska Department of Fish and Game, Fishery Data Series No. 98-25 (Revised), Anchorage.
- Howe, A. L., R. J. Walker, C. Olnes, K. Sundet, and A. E. Bingham. 2000c. Harvest and catch in Alaska sport fisheries during 1998. Alaska Department of Fish and Game, Fishery Data Series No. 99-41 (Revised), Anchorage.
- Howe, A. L., R.J. Walker, C. Olnes, and A. E. Bingham. 2000d. Harvest, catch, and participation in Alaska sport fisheries during 1999. Alaska Department of Fish and Game, Fishery Data Series No. 01-8, Anchorage.
- Jones, M. 1998. The economic value of Alaska's Copper River personal use and subsistence fisheries: an application of the zonal travel cost model. Master's thesis, University of Alaska, Fairbanks.
- Lafferty, R. and D. Bernard. 1993. Stock assessment and biological characteristics of burbot in Lake Louise, Moose, and Tolsona lakes, Alaska, 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-19, Anchorage.
- Lafferty, R., J. F. Parker, and D. R. Bernard. 1990. Stock assessment and biological characteristics of burbot in lakes of interior Alaska during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-48, Anchorage.
- Lafferty, R., J. F. Parker, and D. R. Bernard. 1991. Stock assessment and biological characteristics of burbot in lakes of interior Alaska during 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-57, Anchorage.
- Lafferty, R., J. F. Parker, and D. R. Bernard. 1992. Stock assessment and biological characteristics of burbot in lakes of interior Alaska during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-20, Anchorage.
- Lafferty, R.J. and D. Vincent-Lang. 1991. Status of lake burbot stocks in the Upper Copper/Upper Susitna Management Area. Report to the Board of Fisheries, January 1991. Anchorage.
- LaFlamme, Todd R. 1997. Creel and escapement estimates for chinook salmon on the Gulkana River, 1996. Alaska Department of Fish and Game, Fishery Data Series No. 97-12, Anchorage.
- Layman, R.C., J.R. Boyce, K.R. Criddle. 1996. Economic valuation of the chinook salmon sport fishery of the Gulkana River, Alaska, under current and alternate management plans. Land Economics, 72 (1):113-28.

## LITERATURE CITED (Continued)

- Mills, M. J. 1979. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1978-1979, Project F-9-11, 20 (SW-1), Juneau.
- Mills, M. J. 1980. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1979-1980, Project F-9-12, 21 (SW-1), Juneau.
- Mills, M. J. 1981a. Alaska statewide sport fish harvest studies (1979). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22 (SW-I-A), Juneau.
- Mills, M. J. 1981b. Alaska statewide sport fish harvest studies (1980). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22 (SW-I-A), Juneau.
- Mills, M. J. 1982. Alaska statewide sport fish harvest studies (1981). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1981-1982, Project F-9-14, 23 (SW-I-A), Juneau.
- Mills, M. J. 1983. Alaska statewide sport fish harvest studies (1982). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1982-1983, Project F-9-15, 24 (SW-I-A), Juneau.
- Mills, M. J. 1984. Alaska statewide sport fish harvest studies (1983). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1983-1984, Project F-9-16, 25 (SW-I-A), Juneau.
- Mills, M. J. 1985. Alaska statewide sport fish harvest studies (1984). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1984-1985, Project F-9-17, 26 (SW-I-A), Juneau.
- Mills, M. J. 1986. Alaska statewide sport fish harvest studies (1985). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1985-1986, Project F-10-1, 27 (RT-2), Juneau.
- Mills, M. J. 1987. Alaska statewide sport fisheries harvest report. Alaska Department of Fish and Game, Fishery Data Series No. 2, Juneau.
- Mills, M. J. 1988. Alaska statewide sport fisheries harvest report. Alaska Department of Fish and Game, Fishery Data Series No. 52, Juneau.
- Mills, M. J. 1989. Alaska statewide sport fisheries harvest report. Alaska Department of Fish and Game, Fishery Data Series No. 122, Juneau.
- Mills, M. J. 1990. Harvest and participation in Alaska sport fisheries during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-44, Anchorage.
- Mills, M. J. 1991. Harvest, catch, and participation in Alaska sport fisheries during 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-58, Anchorage.
- Mills, M. J. 1992. Harvest, catch, and participation in Alaska sport fisheries during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-40, Anchorage.
- Mills, M. J. 1993. Harvest, catch, and participation in Alaska sport fisheries during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-42, Anchorage.
- Mills, M. J. 1994. Harvest, catch, and participation in Alaska sport fisheries during 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-28, Anchorage.
- Mills, M. J. and A. Howe. 1992. An evaluation of estimates of sport fish harvest from the Alaska statewide mail survey. Alaska Department of Fish and Game, Special Publication No. 92-20, Anchorage.
- Mushovic, K.J. 1999. Personal communication. Bureau of Land Management, Glennallen District.
- Parker, J. F., W. D. Potterville, and D. R. Bernard. 1987. Stock assessment and biological characteristics of burbot in lakes of interior Alaska during 1986. Alaska Department of Fish and Game, Fishery Data Series No. 14, Juneau.
- Parker, J. F., W. D. Potterville, and D. R. Bernard. 1988. Stock assessment and biological characteristics of burbot in lakes of interior Alaska during 1987. Alaska Department of Fish and Game, Fishery Data Series No. 65, Juneau.

## LITERATURE CITED (Continued)

- Parker, J. F., R. Lafferty, W. D. Potterville, and D. R. Bernard. 1989. Stock assessment and biological characteristics of burbot in lakes of interior Alaska during 1988. Alaska Department of Fish and Game, Fishery Data Series No. 98, Juneau.
- Perry-Plake, L. J. and D. R. Bernard. *In prep.* Stock assessment and biological characteristics of burbot in Susitna and Tolsona Lakes, 2002. Alaska Department of Fish and Game, Fishery Data Series No. XX-XX, Anchorage.
- Potterville, W. D. and K. A. Webster. 1990. Estimates of sport effort and harvest of chinook salmon from the Klutina and Gulkana rivers, 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-58, Anchorage.
- Roberson, K. and C. Whitmore. 1991. Copper River subsistence and personal use salmon fishery management and research, 1990. Alaska Department of Fish and game, a report to the Alaska Board of Fisheries, Prince William Sound Data Report No. 2C91-01. Anchorage.
- Roth, K. and K. Delaney. 1989. Estimates of sport effort and harvest of chinook salmon in the Klutina River, 1988. Alaska Department of Fish and Game, Fishery Data Series No. 80, Juneau.
- Sarafin, D. 2000. Progress report of Copper River Basin Chinook Salmon coded-wired tag releases, 1997-1999, and outlook for adult recovery. Alaska Department of Fish and Game, Fishery Data Series No. 00-10, Anchorage.
- Sarafin, D. *In prep.* Summary of Copper River Basin Chinook Salmon coded-wired tag release and adult recovery, 1997-2002. Alaska Department of Fish and Game, Fishery Data Series No. XX-XX, Anchorage.
- Sarafin, D. *In prep.* Enumeration of chinook salmon in the Gulkana River drainage, 2002. Alaska Department of Fish and Game, Fishery Data Series No. XX-XX, Anchorage.
- Savereide, J. and M. Evenson. *In prep.* Inriver abundance, spawning distribution and migratory timing of Copper River chinook salmon in 2001. Alaska Department of Fish and Game, Fishery Data Series No. XX-XX, Anchorage.
- Scanlon, B. P. *In prep.* Stock assessment and biological characteristics of lake trout in Paxson Lake, 2002. Alaska Department of Fish and Game, Fishery Data Series No. XX-XX, Anchorage.
- Scanlon, B. P. and J. T. Fish. 2000. Abundance and composition of Arctic grayling in Mendeltna Creek, 1999. Alaska Department of Fish and Game, Fishery Data Series No. 00-5, Anchorage.
- Sharp, D., T. Joyce, J. Johnson, S. Moffitt, and M. Willette. 2000. Prince William Sound management area 1999 annual finfish management report. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division. Regional Information Report No. 2A00-32, Anchorage.
- Szarzi, N. J. 1992. Evaluation of lake trout stock status and abundance in Paxson Lake and Lake Louise. Alaska Department of Fish and Game, Fishery Data Series No. 92-34, Anchorage.
- Szarzi, N. J. 1993. Evaluation of lake trout stock status and abundance in selected lakes in the upper Copper and upper Susitna drainages. Alaska Department of Fish and Game, Fishery Data Series No. 93-48, Anchorage.
- Szarzi, N. J. and D. R. Bernard. 1994. Evaluation of lake trout stock status and abundance in selected lakes in the upper Copper and upper Susitna drainages, 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-43, Anchorage.
- Szarzi, N. J. and D. R. Bernard. 1995. Evaluation of lake trout stock status and abundance in selected lakes in the upper Copper and upper Susitna drainages, 1994. Alaska Department of Fish and Game, Fishery Data Series No. 95-40, Anchorage.
- Szarzi, N. J. and D.R. Bernard. 1997. Evaluation of lake trout stock status and abundance in selected lakes in the upper Copper and upper Susitna drainages, 1995. Alaska Department of Fish and Game, Fishery Data Series No. 97-5, Anchorage.



## LITERATURE CITED (Continued)

- Taube, T. T. 2000. Area management report for the recreational fisheries of the Upper Copper/Upper Susitna River management area, 1996-1997. Alaska Department of Fish and Game, Fishery Management Series No. 00-4, Anchorage.
- Taube, T. and D. Bernard. 1995. Stock assessment and biological characteristics of burbot in Lake Louise and Tolsona Lake, Alaska, 1994. Alaska Department of Fish and Game, Fishery Data Series No. 95-14, Anchorage.
- Taube, T. and D. Bernard. 1999. Stock assessment and biological characteristics of burbot in Hudson and Moose lakes, 1998 and Tolsona Lake, 1995-1998. Alaska Department of Fish and Game, Fishery Data Series No. 99-38, Anchorage.
- Taube, T. and D. Bernard. 2001. Stock assessment and biological characteristics of burbot in Tolsona Lake, 2000. Alaska Department of Fish and Game, Fishery Data Series No. 01-26, Anchorage.
- Taube, T. and D. Bernard. *In prep.* Stock assessment and biological characteristics of burbot in Paxson, Sucker and Tolsona lakes, 2001. Alaska Department of Fish and Game, Fishery Data Series No. XX-XX, Anchorage.
- Taube, T., D. R. Bernard and R. Lafferty. 1994. Stock assessment and biological characteristics of burbot in Lake Louise, Hudson and Tolsona Lakes, Alaska, 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-4, Anchorage.
- Taube, T. T., Perry-Plake, L. J. and D. R. Bernard. 2000. Stock assessment and biological characteristics of burbot in Tolsona Lake, 1999 and Lake Louise, 1995-1996, 1999. Alaska Department of Fish and Game, Fishery Data Series No. 00-40, Anchorage.
- Walker, R. J., C. Olnes, K. Sundet, A. L. Howe, and A. E. Bingham. *In prep.* Participation, catch, and harvest in Alaska sport fisheries during 2000. Alaska Department of Fish and Game, Fishery Data Series, Anchorage.
- Williams, F. T. and W. D. Potterville. 1983. Inventory and cataloging of sport fish and sport fish waters of the Copper River, Prince William Sound, and the upper Susitna River drainages. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1982-1983, Project F-9-15, 24 (G-I-F).
- Wuttig, K. G. and M. J. Evenson. 2001. Inriver abundance, spawning distribution, and migratory timing of Copper River chinook salmon in 2000. Alaska Department of Fish and Game, Fishery Data Series No. 01-22, Anchorage.

## **APPENDIX A**

**Appendix A.-Listing of the addresses and contact numbers for information sources regarding UCUSMA information.**

<b>Organization</b>	<b>Address</b>	<b>Phone</b>	<b>Internet address</b>
<b>Alaska Department of Fish and Game</b> - <b>Glennallen Area office</b>	<b>PO Box 47 Glennallen, AK 99588-0047</b>	<b>(907) 822-3309</b>	<a href="http://www.state.ak.us/local/akpages/FISH.GAME">www.state.ak.us/local/akpages/FISH.GAME</a>
- <b>Fairbanks Regional office</b>	<b>1300 College Road Fairbanks, AK 99701-1599</b>	<b>(907) 459-7207</b>	
<b>U.S. Bureau of Land Management</b>	<b>PO Box 147 Glennallen, AK 99588-0147</b>	<b>(907) 822-3217</b>	<a href="http://www.glennallen.ak.blm.gov">www.glennallen.ak.blm.gov</a>
<b>Wrangell-St. Elias National Park &amp; Preserve</b>	<b>PO Box 439 Copper Center, AK 99573</b>	<b>(907) 822-5234</b>	<a href="http://www.nps.gov/wrst">www.nps.gov/wrst</a>
<b>Ahtna, Inc</b>	<b>PO Box 649 Glennallen, AK 99588-0649</b>	<b>(907) 822-3476</b>	
<b>Chitina Native Corporation</b>	<b>PO Box 3 Chitina, AK 99566</b>	<b>(907) 823-2223</b>	
<b>Greater Copper Valley Chamber of Commerce</b>	<b>PO Box 469 Glennallen, AK 99588-0469</b>	<b>(907) 822-5555</b>	<a href="http://www.traveltoalaska.com">www.traveltoalaska.com</a>

## **APPENDIX B**

**Appendix B.—Reference information specific to 2002 Board of Fisheries proposals.**

<b>Proposal(s)</b>	<b>Reference Text</b>	<b>Page</b>	<b>Tables</b>	<b>Page</b>	<b>Figures</b>	<b>Page</b>
42, 43, 28, 34, 30, 31, 35, 36, 38, 39, 40, 41, 22, 26, 32, 33, 37, 25, 29, 27	Copper River Personal Use and Subsistence Salmon Fisheries	70	16, 17	74, 76	11, 12	75, 77
80, 87, 88, 89, 90, 91	Lake Trout Sport Fisheries	92	21, 22, 23	94-96	14	93
80, 93, 94, 95, 96	Burbot Sport Fisheries	99	24, 25	101-102	15	100
80, 99, 100	Arctic grayling Sport Fisheries	83	18, 19	84, 86		85
80, 97	Wild Rainbow Trout and Steelhead Trout Sport Fisheries	107	26, 27, 28, 29	109-112	7	43
44, 45, 77	Established Mgmt Plans and Policies; Major Issues (Copper River Chinook Mgmt Plan)	22	9	33		
77, 78, 79, 80	Chinook Salmon Sport Fisheries	27	9, 10, 11, 12			
85	Gulkana River Chinook Salmon Sport Fisheries	42	11, 12, 13	39-40; 44	7, 8	43, 46
80, 81, 82, 83	Klutina River Chinook Salmon Sport Fisheries	52	11, 12, 14	39-40; 53	9	54
80, 86	Other Copper Basin Chinook Salmon Fisheries	60	11, 12	39-40	10	61
84	Gulkana River Chinook Salmon Sport Fisheries (Current Issues)	50-51				
76	Gulkana River Sockeye Salmon Sport Fisheries	64	15			